VOLUME 32 SEPTEMBER 1939 NUMBER 9

Southern Medical Journal

Journal of the Southern Medical Association

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Southern Medical Association, Thirty-Third Annual Meeting, Memphis, Tennessee, November 21-24

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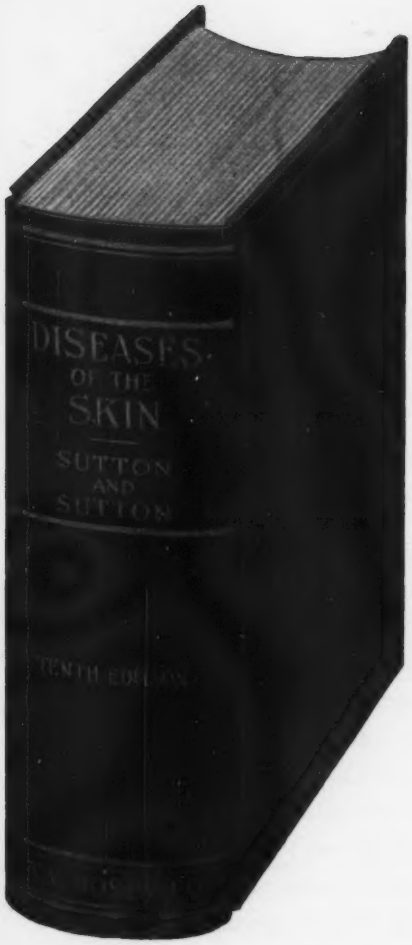

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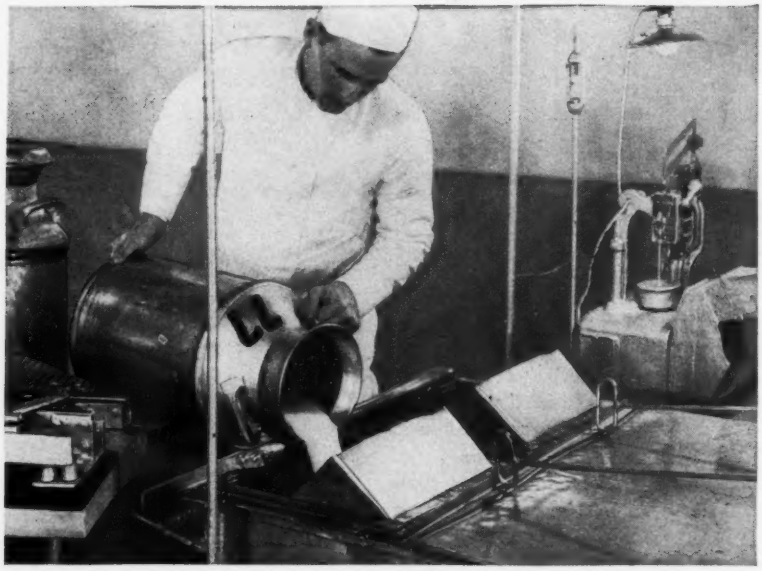

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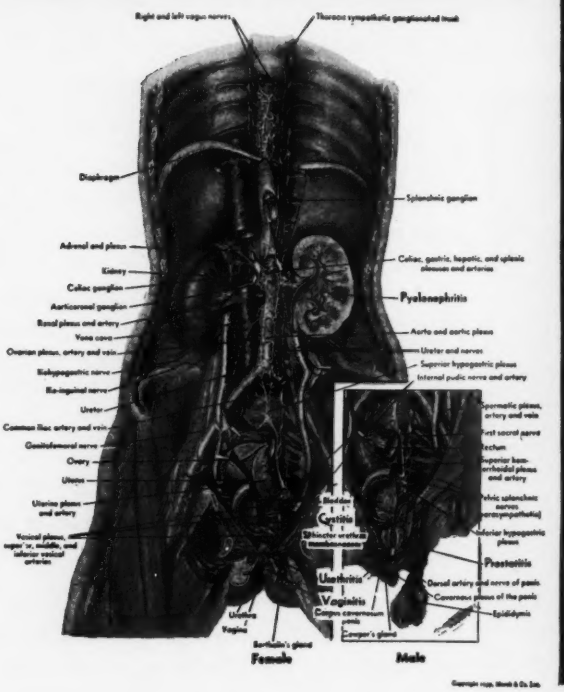

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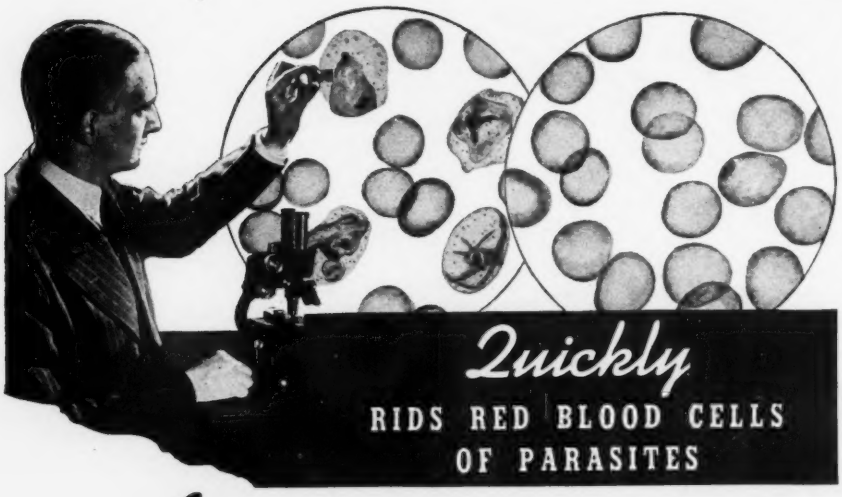

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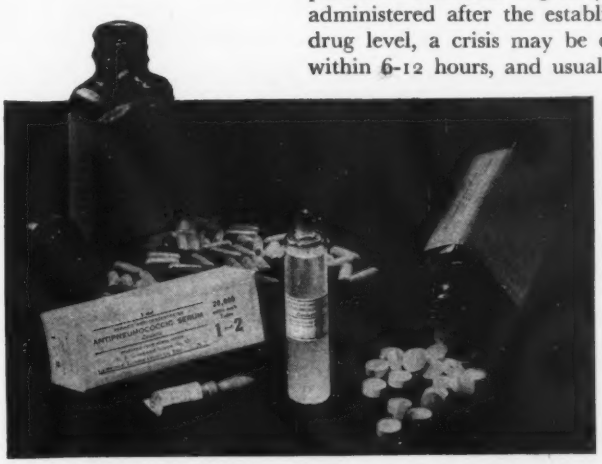

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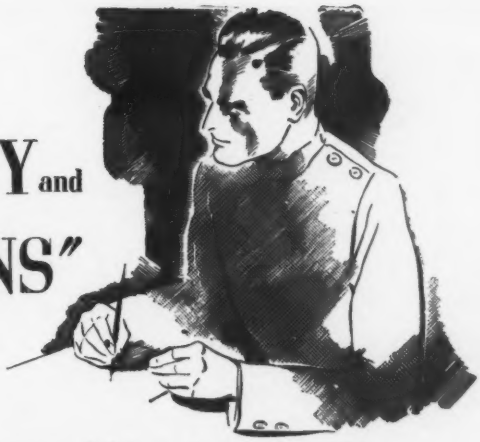

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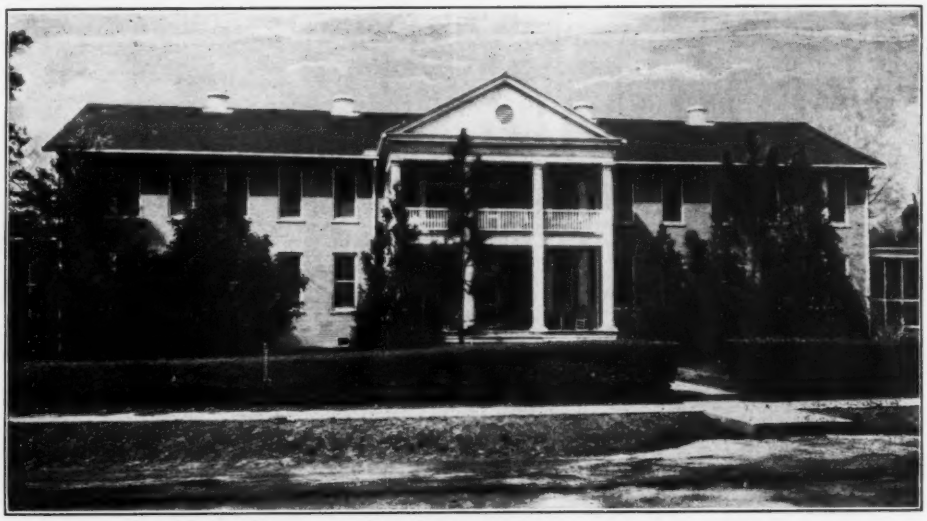

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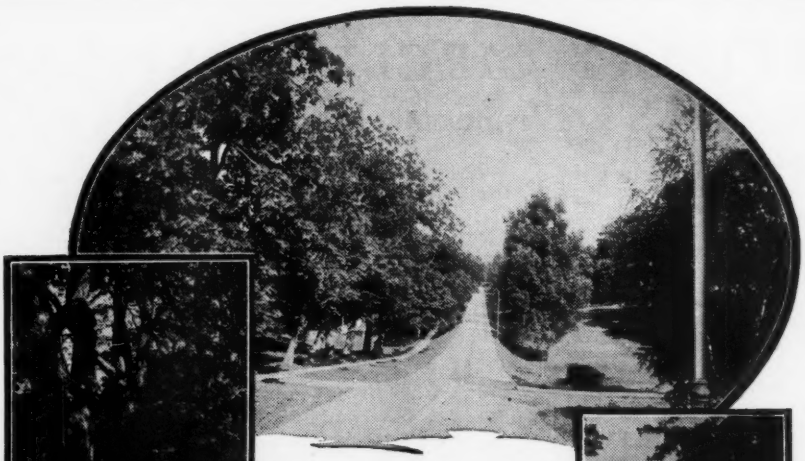

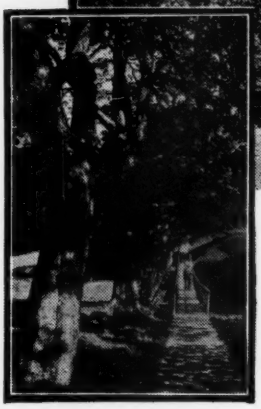

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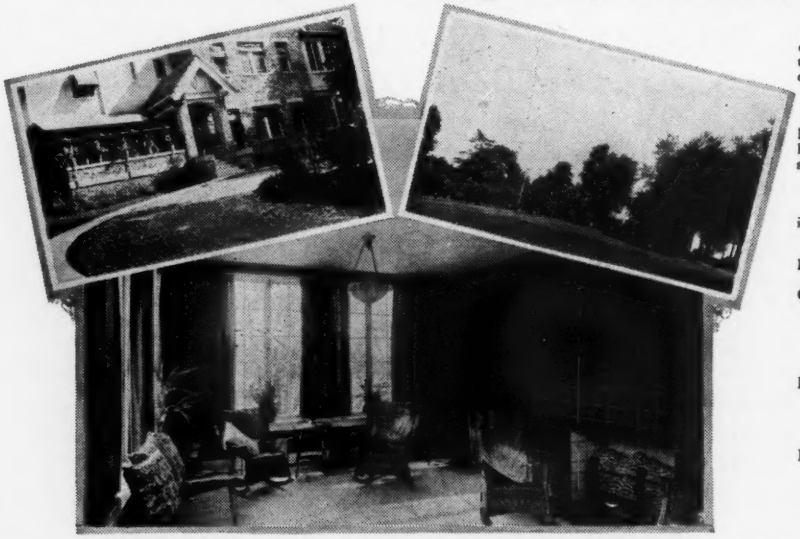

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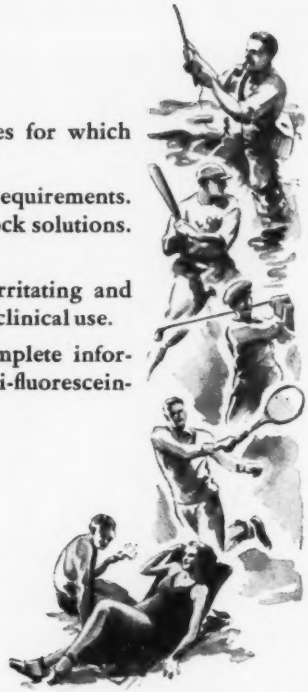

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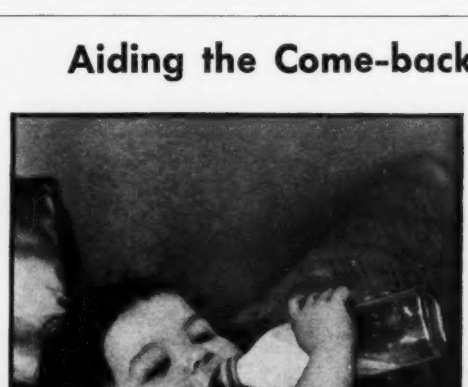

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PUBLISHED MONTHLY BY THE SOUTHERN MEDICAL ASSOCIATION AT BIRMINGHAM, ALA.

Volume 32 SEPTEMBER 1939 Number 9

COMPOUND FRACTURES AND THEIR TREATMENT*

By AUSTIN T. MOORE, M.D.
and
JAMES T. GREEN, M.D.
Columbia, South Carolina

A compound fracture is one in which the skin is penetrated and the fracture site is in communication with the outside air. There are primary and secondary compound fractures. Primary compound fractures are due to violence, external or internal, and the fracture may be compounded from within or from without. If they are compounded from within and the bone simply makes a small puncture wound in the skin, there may be no infection. When they are compounded from without and there has been created a large jagged wound from external violence, the fracture should always be regarded as infected and so treated. Secondary compound fractures are brought about by open reduction or by instances where the bone sloughs through the skin, or when it comes through by pressure.

In this paper, we are concerned with the treatment of primary compound fractures.

GENERAL TREATMENT

Of first consideration in all compound fractures is first aid. "Splint them where they lie" is the army dictum promulgated during the World War which should never be forgotten. The skin surrounding the wound should be treated with an antiseptic and covered with sterile gauze when possible. The limb should be straightened, but if projecting fragments of bone are present, they should not be reduced before proper cleansing. Hemorrhage should be controlled by a tourniquet if necessary and the patient should be transported to a hospital as rapidly but as gently as possible. If the patient is in great shock so that operation is contraindicated, some time may be lost; otherwise, every compound fracture case should be looked upon as an acute emergency and not a minute should be lost in taking the patient immediately to the operating room. Every second lost means allowing infection the opportunity to develop.

If shock has to be treated, we usually rely on immobilization of the part and enough morphine to produce anatomical and physiologic rest. External heat is used to keep the patient warm, the foot of the bed is elevated and intravenous fluids or a transfusion of blood is given if necessary. There are times when even in the presence of severe shock operation is performed to remove a horribly mangled extremity which, if allowed to remain, would be productive of still greater shock later on. In such cases, a transfusion should be given at the time of operation. Tetanus antitoxin should be given in all compound fracture cases. In severe instances, it should be repeated every seven days for three or four doses. Intradermal skin tests will determine allergic individuals, and in some cases repeated small injections should be given for desensitization. The mixed antitoxin of tetanus and gas bacillus should be used frequently, and I see little argument against its routine administration.

The development of gas infection should always be kept in mind. X-rays should not be misleading, as air may enter the wound at the time of accident and be reported by the radiologist as gas in the tissues. Swelling of the extremity with copper-colored mottling of the skin, a fetid odor and gas bubbles from the wound, plus crackling or crepitus on pressure over the skin and a very sick patient with pulse elevated out of proportion to the temperature

*Read in Section on Bone and Joint Surgery, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

are all that is necessary to make the diagnosis of gas infection. However, there are borderline cases. Repeated inspection of the wound at one-half hour intervals to determine whether or not there is gas formation and repeated smears for microscopic study should positively establish the diagnosis. One should always remember that it is possible to find gas bacillus organisms on microscopic study, rather, short thick bacilli resembling the Welsh bacillus, and yet clinically not have a gas infection. In treating gas infection, x-rays, sulfanilamide and other agencies have been reported as successful. It may at times be possible to open thoroughly, remove entire muscle groups involved, irrigate and aerate the wound and check the infection. However, these instances are rare and it is my opinion that usually a high guillotine amputation is the method of choice.

TREATMENT OF THE FRACTURE ITSELF

To attempt to make routine, or to formulate certain rules regarding the treatment of compound fractures, is to invite disaster. There are a number of different methods that can be used. Each case is an individual problem and many factors influence the plan of treatment. The age of the patient, general physical condition, risk for operation, shock, hemorrhage, adjacent skin infection, focal infections, great swelling, contusion or extensive laceration of soft parts, presence of hematoma or extravasated blood, severed tendons, muscles or nerves, presence of infection, time elapsed since injury, body cleanliness of the individual, character of material causing the fracture, if compounded from without, the character of surroundings where the accident occurred, the occupation of the patient, the desire or necessity to return to work, material means of the patient to offset prolonged hospitalization, the physical character of the fracture itself, whether comminuted, oblique or transverse, are all very definite factors and their careful consideration determines the plan of treatment. Other influences which are less often considered, but which are equally important, are the intangible or imponderable factors, the general nervous, mental or psychological attitude of the patient, the presence of fear, mistrust, hatred, revenge, intention of litigation, restlessness or indifference may also have a decided influence on the general plan of treatment.

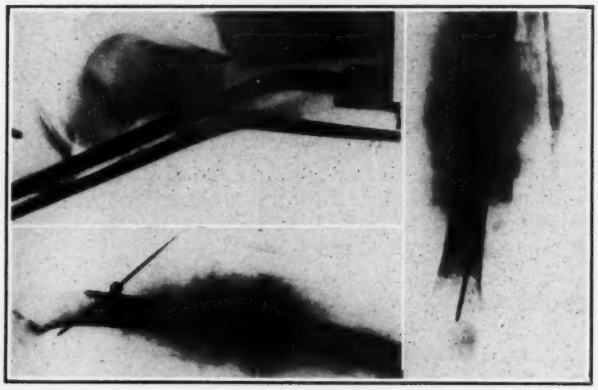

Fig. 1

In this case soft tissue was interposed between the fragments. Skeletal traction was used and in addition two unsuccessful attempts at reduction were made under general anesthesia. At open reduction a long protruding screw with lock nut was used for internal fixation, holding the fragments in perfect apposition. It was later removed.

LOCAL CARE OF THE WOUND

In the operating room the first step in the local treatment is cleansing the wound. Many antiseptics have been recommended, but it is my belief that the simplest and least irritating ones are the best. An antiseptic strong enough to kill germs is strong enough to coagulate or do harm to tissue cells. This particularly applies to the use of antiseptics deep in the soft tissues. Mechanical cleansing is much better than chemical cleansing. We never probe a wound and swab it with strong antiseptics. If this is felt to be necessary, I prefer to open widely and clean mechanically. To prepare the part, the operator scrubs his hands as for operation, dons cap, mask, gown and gloves and the injured extremity is cleaned with a mild white soap and sterile water. All brushes, gauze and basins used must be sterile. The wound is covered with sterile gauze and the limb is first shaved and cleaned, working away from the wound. Finally, the wound itself is thoroughly washed, using large wads of soft cotton. We frequently use gallons of water and spend twenty minutes or more in this preliminary preparation. Normal saline solution is used in the final flushing of the wound. The skin is washed with ether and if one prefers, a non-irritating antiseptic may be used to paint the skin. No antiseptic is used in the wound.

When the fracture has been compounded from within and only a small skin wound has been created; when the fracture is of the type that mechanically does not require open reduction; and when in consideration of all of the factors previously mentioned the possibility of infection is considered unlikely, we cleanse the wound properly, put on a sterile pressure dressing and treat the case as though it were a simple fracture, with the exception that very careful observation is kept to determine whether or not infection is developing. In case of infection, incision and drainage are immediately instituted. In cases of small puncture wound, but with great contusion, swelling, ecchymosis and damage to the soft parts, it is our belief that they should be opened widely, properly cleansed, the fracture fixed and the wound closed very loosely to allow for drainage. I have never seen a case so treated become infected.

INFECTED COMPOUND FRACTURES

It has been stated that infection does not develop in less than twelve to twenty-four hours and that treatment of a compound fracture can be delayed for this length of time. This is exceedingly dangerous teaching. Proper cleansing of the wound should be done at the earliest possible moment. Infection may be well under way in six to eight hours, and it is better practice to make every possible effort to institute treatment within a period of four hours after the accident. If properly handled within this period almost every case will do as well as a simple fracture with open reduction. In all cases where there is extensive laceration of the soft parts, operation is indicated. After cleansing the wound, a careful debridement is done. All dead and devitalized tissue is removed, the torn edge of the skin wound is excised, hematoma pockets and extravasated blood collections are thoroughly opened and drained. The bone is exposed by enlarging the wound if necessary, placing the incision so that muscle is separated in its fascial plane and important blood vessels and nerves are avoided. The bone ends are gently curetted and if grossly contaminated by dirt or other material that has been ground in, this portion of the bone should be removed by rongeur forceps. It is usually a mistake to remove loose fragments of bone in comminuted fractures. Most loose fragments have some periosteal attachment and are viable. They act as grafts to bridge the gap and stimulate union. Bone growth will not jump a gap, and the fragments should be apposed to each other as perfectly and as closely as possible. From the time the patient is first seen, during the operation and until the final fixation dressing is applied, extreme gentleness should be exercised. The limb should be kept in alignment and constant traction applied to overcome muscle spasm and to prevent the sharp knife-like edges of the fractured bone from doing more harm. Sharp retractors and tooth forceps should not be used. The tissues should be handled "lovingly." Large amounts of tissue should not be included in vessel ligatures, and it is my policy to use as few ligatures as possible. Most vessels do not need ligation. Hemorrhage is adequately controlled by allowing the hemostat to remain in place several minutes, after which time it can safely be removed. If the patient's general resistance is good, and the local resistance of the wound is preserved by careful and delicate handling of the tissues, and if all other factors are favorable, it is our belief that nature will take care of almost any infection that may be present. Other important influences on wound heal-

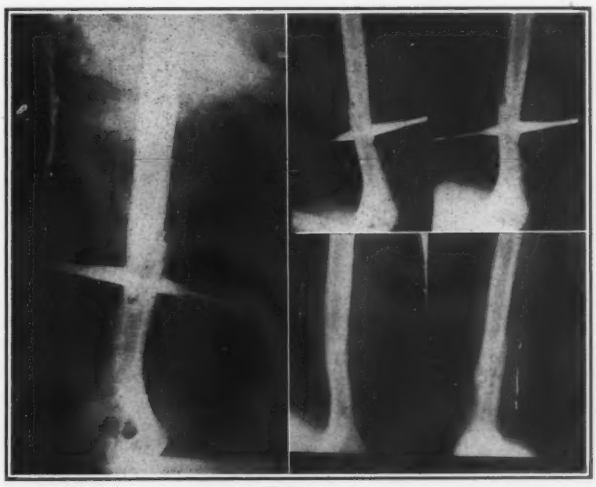

Fig. 2

In this compound fracture of the lower third of the humerus, a removable stainless bolt for fixation was immediately used. Early active motion was instituted. Solid union resulted and the bolt was removed two months after injury.

ing are: leave no pockets to collect blood clots or serum, incise when necessary for dependent drainage, close the wound loosely, adequately immobilize the limb for physiological rest, and elevate or apply compresses to prevent swelling.

Now about handling the bone itself. Some surgeons unhesitatingly use internal fixation, others decry its use and claim that it invites or produces infection. There should be a middle ground. I avoid the use of internal fixation as much as possible, but if the fracture is mechanically of the type which requires internal fixation, then I feel that its immediate application is advisable. If internal fixation is not applied, but is reserved until the wound heals, and if peradventure infection does develop, be it ever so slight, then the golden opportunity has been lost. Months of time may be wasted, numerous operations, nonunion or even amputation may be the final outcome. The simplest method of internal fixation is the best. Frequently a small wire, a screw, a bolt or a projecting pin or screw may be used, depending on the site and the mechanical nature of the fracture. During the past five years I have been using a method of internal fixation which has proven valuable in certain carefully selected cases. The instrument is a small removable stainless steel bolt. Rigid fixation may be maintained for a number of weeks, and it can easily be removed without the necessity of a subsequent operation. If a plate is necessary, I feel that it is entirely safe if properly applied, and its application has a great many advantages. Cases have failed after bone plating operations more because of faulty technic than because of the method.

The committee on treatment of fractures of the American College of Surgeons has published its report on the use of bone plates and screws. Besides the use of defective or unstandardized material, the principal errors are as follows:

(1) Faulty aseptic technic, imperfect hemostasis and unnecessary trauma in handling tissues, with resulting wound infection.

(2) Use of undersized plates or screws for a given type of fracture.

(3) The effort to adapt a straight, rigid plate to a curving bone surface by driving the screws home and springing the plate. This throws too great tension upon the screws.

(4) Drilling the holes for the screws with a drill too large to permit the threads to engage firmly.

(5) Failure to drill the holes deeply enough to permit the screws to be driven completely home, thus incurring the risk of twisting off the head of the screw or of not securing complete fixation of the plate.

(6) Engaging the self-tapping screw obliquely in the

Fig. 3

Case of fracture of both femurs. Closed reduction accomplished on one side, open reduction necessary on the other. A pin was used for fixation and left protruding through the cast. It was later withdrawn, leaving no foreign material in the wound.

drill hole and driving it in without correcting the alignment. This subjects the screw to too great bending strain and leads to breakage.

(7) Failure to use a certain number of long screws, transfixing the opposite cortex of the bone. Transfixion screws add security.

(8) Failure to protect the plated fracture adequately during the closure of the wound and the subsequent application of splints. It is during this stage that the plate is most frequently broken.

In many cases the fragments may be locked securely together so that no internal fixation is necessary. A pin which transfixes the bone above and below the fracture may be incorporated in the cast and thus hold the fragments in apposition. Skin or skeletal traction may be used with the extremity suspended in a Thomas splint. The latter method is especially advantageous when moist dressings or frequent wound inspections are necessary.

Regarding the final disposition of the wound, a number of methods are commonly practiced, principally the following:

(1) Close the wound completely and tightly and treat the case as a simple fracture.

(2) Drainage of the wound by rubber dam tissue or soft rubber tube drains.

(3) Carrell-Dakin method of irrigation with chlorinated soda solution.

(4) Orr method of vaseline gauze pack and plaster cast.

(5) Various materials advocated to pack the wound and treat similarly to Orr technic.

(6) Close loosely with no drainage material in place.

As a rule, I prefer the latter method and usually close the wound loosely, with interrupted sutures widely placed and immobilize the limb rigidly. If the wound is to be closed tightly, I feel it is very important to begin from the bottom and work outward, closing very snugly layer by layer, leaving as small an amount of foreign material as possible in the wound. The suture should be of fine quality, preferably chromosized catgut, tied snugly but not tight enough to strangulate, and the ends cut as short as possible. All tension should be placed on the fascia and deeper tissues, making it possible to approximate the skin with ease. We especially recommend that in compound fracture cases where the wound is over the crest of the tibia the skin should be completely closed. This is done by making a counter incision or grafting skin if necessary. There are occasions when, after the skin is closed over the tibial crest, it is wise to make a counter incision for dependent drainage. Such cases illustrate the paradoxical

Fig. 4

A fracture dislocation of the ankle involving the posterior lip of the tibia with posterior dislocation of the astragalus and fracture of the lower ends of the tibia and fibula. A small stainless steel bolt was used to hold the posterior lip of the tibia, a similar bolt to hold the fibular fragments and a stainless steel nail for the fracture of the internal malleolus. There was active motion after ten days with full functional recovery.

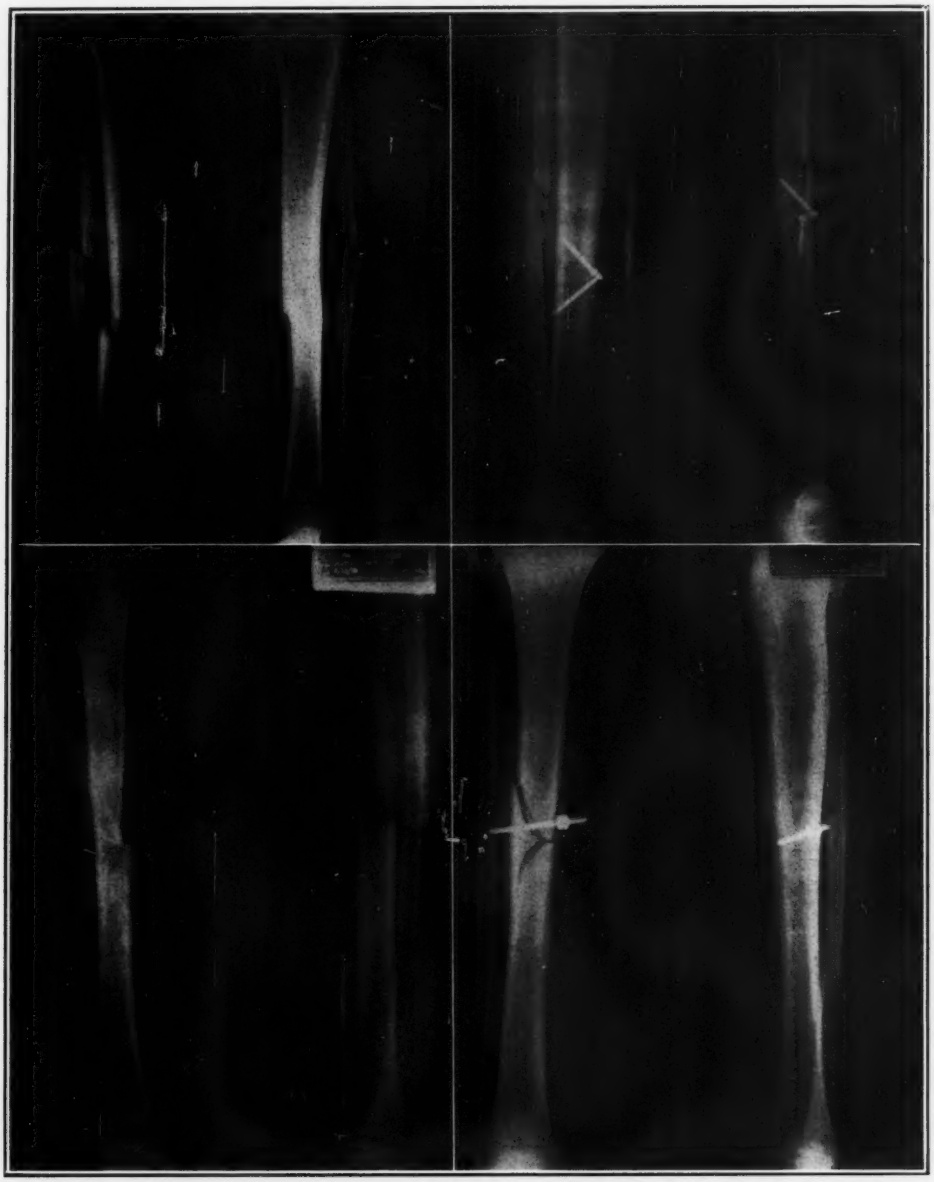

Fig. 5

These cases illustrate the fact that frequently a simple screw can be used instead of the conventional plating operation. In figure 1 there was a V-shaped loose fragment of bone. Two screws were used which held the fragments rigidly immobilized. In figure 2 the loose fragment was incompletely fractured and only one screw was necessary. This is a specially devised stainless steel screw with double lock nut. It may be easily removed with a tubular wrench through a small stab incision under local anesthesia.

teaching of complete closure of the wound, at the same time leaving a wound wide open for drainage. We never use any kind of drainage material in this type of wound. Whenever a compound wound is completely closed, a firm compression dressing is indispensable. If this pressure is not applied edema and collection of fluid in the tissue spaces will occur with swelling of the part, tension of the skin and ultimately there may be necrosis and sloughing of the entire suture line with secondary infection. All compound fracture cases should be kept under

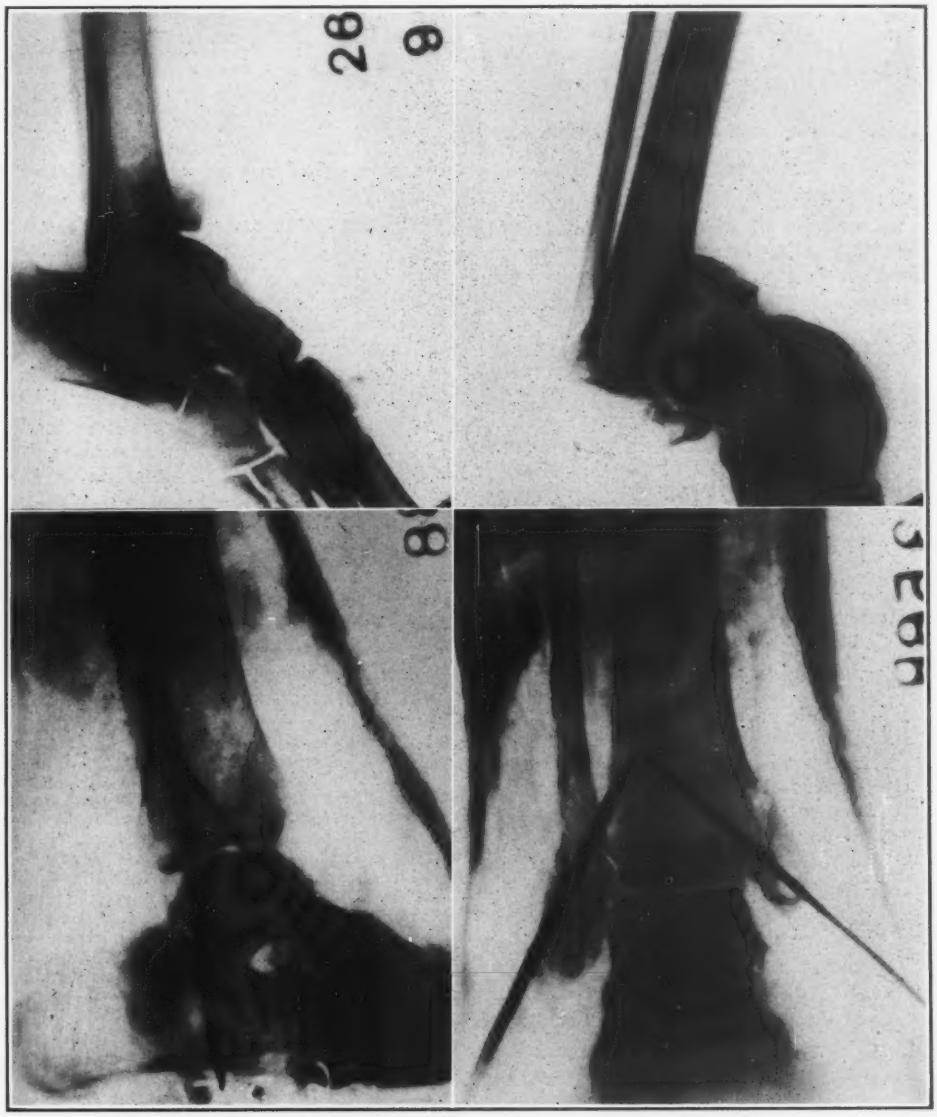

Fig. 6

A severe compound fracture dislocation of the ankle with the capsule of the joint severely torn made fixation of the malleoli necessary. Fixation was accomplished by means of two projecting pins which were easily withdrawn a few weeks later.

very close observation to determine whether or not infection is developing.

GUNSHOT WOUNDS

When a compound fracture is caused by the bullet from a modern high speed weapon, the bullet is usually sterile and unless mechanically it endangers some important structure, there is no need for its removal. It may be disregarded in the care of the case. If the injury is due to a slow-moving projectile, especially if it is large and has sharp, jagged edges, then it should be removed and the area appropriately drained.

OLD COMPOUND INFECTED CASES

Old compound fractures with infection are treated as cases of localized osteomyelitis. A sculpturing, sancerization operation is performed, all diseased bone is removed, the wound is packed with vaseline gauze and a cast is applied as in the Orr technic. Due to the fact that a quiescent tetanus infection may become active following secondary operation, it is always wise to give the antitoxin at this time also. The advantage of the Orr technic is that the patient may be sent home and return at intervals for changes of plaster. When nonunion is present in addition to infection, occasionally it may be justifiable to drill holes to increase blood supply and to do a bone graft at the time of the curetting operation; but, as a rule, it is wisest and more discreet to wait for wound healing before doing a bone graft.

It is interesting to recall that during the Civil War certain military statistics showed that over 95 per cent of the patients with compound fractures died with or without amputation. Now with modern knowledge and aseptic facilities, a surgeon seldom loses a patient with compound fracture, and rarely is amputation necessary. In reviewing approximately one hundred private cases from my own files, I could not find, nor do I recall, a single case in which death occurred from sepsis if the patient was seen within a few hours after accident. In one instance amputation was necessary.

SUMMARY AND CONCLUSIONS

(1) In the treatment of compound fractures, first aid is important with especial knowledge of how to combat tetanus and gas infection.

(2) Mechanical cleanliness with soap and water is preferred to chemical cleanliness.

(3) In doubtful cases, it is better to open than to attempt to treat by the closed method.

(4) Probes and antiseptic swabs are not introduced into wounds punctured from within out.

(5) If mechanically the fracture needs internal fixation, it is best that it be done immediately. The simplest type of fixation, easily removed when necessary, is the best. A removable stainless steel bolt is recommended for certain cases.

(6) Any type of internal fixation must be applied under very exacting technic.

(7) Of all methods of treating the wound, loose closure with interrupted sutures is preferred. However, complete closure of the wound can be practiced in a large number of cases.

(8) Traction and suspension or a splint are used after operation. The wound is observed very carefully to determine whether infection is developing.

(9) Perfect reduction and rigid fixation of the fragments with complete immobilization continued over a period of time sufficient for firm, solid union is the finem desideratum in the treatment of all fractures.

(10) Union is usually slower than in simple fractures and immobilization is continued until union is clinically and radiographically solid.

(11) There are a number of different methods of treating compound fractures. In this paper an attempt has been made to present the most important factors for consideration. It is believed that if each case is individualized and if all of the factors are carefully weighed, a decision can be made and a plan of treatment can be instituted which will in a high percentage of cases bring about a satisfactory conclusion.

DISCUSSION (*Abstract*)

Dr. F. A. Stuart, Tulsa, Okla.—First aid after fractures is extremely important. Splinting the patient where he lies certainly aids and will reduce the amount of trauma to the soft parts, reduce shock to the patient and even at times prevent further compounding of the fracture site. In this respect, the American Red Cross with its highway stations will in the future play a very prominent part. In our city the ambulance drivers are now required to pass a first aid course and are required to apply splints before bringing the patient to the hospital. In the past, these patients have been dumped quickly into an ambulance and taken to a hospital, which often further compounded the fractures.

We should strive to convert the compound fracture into a simple one. This can best be done by preventing infection and subsequent suppuration. Frequently the fracture is of secondary importance to the life of the patient and injury to the soft parts.

Dr. Moore has stressed mechanical versus chemical cleansing of these parts. It has been shown that the

modern day antiseptics cause tissue necrosis, which results in an increase in the daily bacterial count and an increase in suppuration. Soap and water and a brush are far more important. There arises in the minds of many surgeons the question of when to do a debridement. I believe that if one is to be done it should be within the first twelve hours.

Some men close these wounds tightly; some leave them open; some use drainage; some do not; some irrigate the wounds with Dakin's solution; other men treat them after the Orr method; others use internal fixation. By this I mean the application of plates which, in my opinion, have a very, very limited field. However, some of the newer metals we have today, certainly vitallium may be used on certain selected occasions. I believe that all these fractures should be treated by traction in some form or other and certainly gas and tetanus antitoxin should be administered. Lastly, I should like to stress individualization in the treatment of each and every compound fracture case.

Dr. J. Warren White, Greenville, S. C.—After reading Bosworth's paper in the last *Journal of Bone and Joint Surgery*, I confess that I am not so strong about radical amputations in gas gangrene as I was and as Dr. Moore apparently is. In view of our previous opinions about early amputations, it will tax our courage severely to rely solely on the serum, yet this recent article is most convincing.

Internal fixation in acute compound fractures, I believe, is dangerous, but as Dr. Moore has said, golden opportunities exist and if a quick simple procedure can be done that will maintain close apposition, I also am enthusiastic about doing it. I use some simple device such as a stainless steel staple made during the operation out of sixteenth inch steel wire with the help of a stout wire-cutter and a couple of pliers. These I sometimes put into bone that I feel sure will subsequently sequestrate and they are of great value in maintaining close apposition for the important first few weeks. We must also remember that Dr. Moore is a past master in the use of wires and does procedures that some of the rest of us cannot duplicate without too much surgery.

I am much in favor of early adequately fenestrated plaster casts, frequently employing also incorporated transfixion wires or pins. It is to be regretted that such a fracture authority as Scudder decries this as a "bastard procedure," and I hope that before the new addition of this book appears he has altered his ideas about this valuable aid in maintaining the prolonged adequate immobilization that compound fractures require.

The general support of the entire extremity, even in the early stages of treatment, is most desirable, as it is of tremendous assistance in getting efficient immobilization. Distraction, however, with these transverse wires must be carefully avoided in spite of the fact that I do not feel that Dr. Moore is justified in stating that bone growth will not bridge a gap. I agree that we must not depend on this and should make an honest effort to get as good apposition as is reasonable under the circumstances. As many of you know, I am much more liberal in being satisfied with ugly looking x-rays than most, and as time goes on I am becoming even less exacting about my x-ray requirements. Dr. Hoke reminded me years ago that we do not have to walk on the x-rays.

The bridging of bone growth across a gap is more comparable to a high frequency current jumping a spark gap than to closing a house circuit current with a contact switch. It is the repair tissue osteoblasts that make bone and not what we see in the x-rays.

The matter of local treatment of acute infected fractures I hope will be discussed by someone who is still using the Carrel-Dakin's treatment. The results obtained during the War evidently did not justify its continuance in civil life and we hear little of it now. It does not displease me, as I always felt that too little dependence was placed on the natural antiseptic properties of the "laudable pus" and too much importance given the laboratory report of the number of organisms per field at the expense of disturbing the more normal repair processes.

The high points in Dr. Moore's paper that deserve particular emphasis are:

(1) Care in early handling.

(2) Early and thorough saline cleansing.

(3) Early serotherapy.

(4) Simple quick internal fixation is necessary and possible.

(5) Long efficient immobilization.

Dr. Robert D. Schrock, Omaha, Neb.—The immediate treatment of compound fractures should be limited to the control of hemorrhage and the application of as clean a dressing as possible, together with emergency splinting for transportation. No antiseptic should be used in the wound and definite care of the wound should not be undertaken until the patient can be transported to a hospital or properly equipped office where adequate facilities are available for good surgical and radiologic technic. It is our habit to use large quantities of sterile normal salt solution for irrigation of the wound and the accompanying mechanical cleansing. Excision of seriously damaged soft parts is done. This excision by no means approaches the radical debridement of days gone by. Whether the accident occurred in an industrial plant, on the highway, or in the farmyard are determining factors in whether we shall leave the wound wide open with a Mikulicz's tampon or do a very loose closure. Reduction and fixation of the fractured bones is accomplished at the preliminary dressing if at all possible. Traction is practically always used. Skeletal traction is avoided wherever possible. Prophylactic tetanus and gas serum are used in doses about twice the size usually recommended. Prophylactic x-radiation is done for at least the first three days, following the technic advised by Dr. James Kelley, of Omaha, and exhibited last year at the meeting of the American Medical Association on the West Coast. We are being convinced of the value of this adjuvant in the inhibiting of grave infection.

Dr. Guy A. Caldwell, New Orleans, La.—I wish to call attention to a group of compound fractures in which it is not wise to use any type of internal fixation and exceedingly dangerous to close the wound tightly. I am sure Dr. Moore has not intended to convey the impression that every case of compound fracture can be treated as he has outlined by use of the various types of internal fixation such as he has shown. I refer, particularly, to that group of compound, comminuted fractures of the long bones, grossly contaminated with soil of the type most likely to carry the spores of

tetanus and gas gangrene bacilli. Comminution of a fracture almost invariably implies extensive soft tissue damage, including maceration and death of muscle tissue and diminution of blood supply to the injured parts. When dirt containing spores of gas gangrene bacilli is implanted in the depths of a wound in the midst of dead muscle tissue, these organisms find it an ideal culture medium for their propagation. Under these conditions, even when a thorough debridement can be done under six hours, it seldom is wise to close the wound tightly and thus produce the anaerobic condition which is the last essential required for the propagation of these dangerous organisms.

Internal fixation of a comminuted fracture at best is difficult and time-consuming, and to add this amount of time and trauma to that required for thorough debridement and then to introduce a foreign body in the presence of contamination is to invite a catastrophe.

In previous publications I have reported a number of cases of gas gangrene and have shown conclusively that under the conditions mentioned the wounds should invariably be left open and no internal fixation used. I trust, therefore, that Dr. Moore will make an exception of this class of cases in his final conclusions concerning the proper method for caring for compound fractures.

Dr. Moore (closing).—I feel that a debridement should be done within the first four hours if possible. The mechanical cleansing and debridement should be done before the organisms have an opportunity to proliferate and invade the tissues. Bacterial invasion has been shown to occur within the first four to six hours. The difference in time between six hours and twelve hours may mean the difference between a wound which is merely contaminated and one which is infected.

I cannot agree with Dr. White's electrical switch comparison of bone jumping a gap. What he says applies readily to fractures in childhood. In such cases, one may allow a great deal of latitude in the alignment and apposition of bone. In adults the fracture problem is different. Perfect apposition and alignment with rigid fixation over a period of time prolonged until union is unquestionably solid will produce better end results. To allow fragments in adult fractures to remain distracted, or to nail the fragments in a cast with a pin above and below the fracture with the bone ends separated is to invite disaster. Delayed or nonunion is almost sure to develop. In my experience it is very important to insist on close bony approximation in adults. It is also well to remember that if x-rays are displayed in a court room it is difficult for a legal mind to reconcile normal function with gross malposition of fragments.

I agree, in the main, with Dr. Caldwell's treatment of the group of cases which he described. However, I cannot subscribe to his statement that "wounds should invariably be left open and no internal fixation used." To individualize these cases is a matter of surgical judgment. In many cases rigid immobilization by internal fixation adds greatly to the safety of the convalescence. Loose fragments irritate and further traumatize the soft tissues, local resistance is lowered, infection increases, delayed union, nonunion, prolonged disability, secondary operations and not infrequently loss of the extremity may be the final outcome. The golden opportunity for internal fixation in compound fractures is immediately after the fracture has occurred.

I do not use internal fixation unless it is impossible to hold the fragments otherwise. I use the simplest type of internal fixation possible made from non-corrosive metal. I do not recall that gas gangrene has developed in any case so treated.

ORTHOPEDIC CARE OF CONVALESCENT POLIOMYELITIS*

REPORT OF 63 CASES ONE YEAR FOLLOWING ACUTE ONSET

By W. VERNON NEWMAN, M.D.
Little Rock, Arkansas

Following the 1914 epidemic of poliomyelitis in New York, Vermont and Massachusetts, the convalescent care of this disease was recognized and established as an orthopedic problem. In 1916 Robert W. Lovett[1] published his "Plan of Treatment of Infantile Paralysis," which consisted of quiet and occasional warm baths during the acute stage. He stressed the necessity of getting the patient on his feet as soon as possible. The latter was done with the aid of braces and the skillful use of muscle training, being careful to avoid fatigue and stretching of the muscles. He did not, however, urge orthopedic treatment until three to six months after the acute onset. Electrical stimulation was advised to prevent muscle atrophy. Lovett,[2] later, altered his opinion of electricity with the statement that it was valueless. Many[3 4 5 6] shared this opinion. H. B. Thomas,[5] the same year, urged that we prevent fatigue, whether from active movements, passive motions or from massage and electricity. Today, he advises keeping the part immobilized, but with frequent massage, by allowing it to rest in a bath. This method, he feels, gives the lightest possible massage. When all tenderness is gone, active and passive motion is cautiously started. Should the muscles seem weaker at the beginning of any treatment than they were at the preceding treatment, the amount of exercise is lessened. Charles Ogilvy,[8] in his report of one hundred ten cases in 1917, said:

"That which has impressed me in regard to the recovery from paralysis is the fact that long continued rest, extending, if possible, for six months' duration in a plaster fixation splint, has been the greatest factor in obtaining the best results."

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*Read in Section on Bone and Joint Surgery, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

Massage was begun at the end of two months after the acute onset. In regard to massage, he said:

"It was soon learned that patients so treated did not do as well as those in which the massage was postponed until the third or fourth month."

The following year Ogilvy[9] stressed the importance of rest for the affected muscles and stated that one year is not too long in some cases.

Except for the increased length of time Thomas and Ogilvy advised for absolute rest, we could not find in the literature any essential alteration of Lovett's plan as advocated in 1916. All orthopedists recognize the importance of rest. However, few[13 22] appear willing to continue rest until an adequate nerve supply has returned to the paralyzed muscles. They express the fear of muscle atrophy and joint stiffness. For these reasons they institute various forms of physical therapy. These are not only expensive and require a trained technician, but also, it is our observation, they are detrimental to maximum recovery if applied too early and too energetically.

The general plan of treatment used by most orthopedic surgeons[10 11 12 13 14 15 17 20 21] is absolute rest during the acute stage. Some apply splints. Light massage may be given with the idea of relieving muscle tenderness. In the convalescent stage, rest and prevention of deformities are obtained with the aid of circular plaster casts or splints. As soon as muscle tenderness disappears, usually two to eight weeks, physical therapy is cautiously initiated. Rest in splints is continued for as much as six months. Weight bearing is permitted with the aid of braces at the end of six months' time.

The sixty-three cases reported in this paper have been under constant observation; some since the onset of the disease, others since being seen first as long as six months after onset, all being followed up to date. We have no new methods to offer, but rather a modified application of existing plans, based upon a different interpretation of the physiology and pathology underlying the disease.

Before taking up the clinical study of this series, let us consider briefly the pathology of poliomyelitis existing at the time of convalescence. Evidence of the true pathology at various periods of convalescence is lacking. We must, therefore, assume that the pathologic processes present during the acute stage are undergoing a gradual restoration to normal in some instances and being replaced by scar tissue in others. Edema and swelling of the spinal cord is subsiding, atrophied and anemic anterior horn cells are regaining their function. Degenerated cells are being replaced by scar tissue. How long these processes require we do not know, but judging from the clinical symptoms to be discussed later, we should say two weeks to a year.

With these ideas of pathology in mind, we wish to discuss certain general considerations of poliomyelitis which bear a close relationship to the recovery from paralysis. Shock, which is usually severe in the acute stage, persists in convalescence in a milder but definite form. The child is irritable, restless, perspires freely, trembles and cries when addressed. The skin remains cold and, in some instances, clammy. The pulse, while variable, usually runs between 110 and 140. This condition has been noted to continue from two weeks to as much as fourteen months.

Little interest has been shown in the nutritional state of the poliomyelitic. We were greatly impressed by the many cases in this series which were definitely in a poor state of nutrition. This was noted regardless of whether the child was seen from the onset of the disease or later in convalescence.

The child shown in *Fig. 1* represents the more advanced undernourished case. For six months prior to admission to the hospital he received physiotherapy and fifteen chiropractic treatments. On admission he had total paralysis of his extremities, spine, neck and abdominal muscles. He showed great weight loss. The skin was inelastic, cold and pallid. The mucous membranes were blanched. His face was expressionless and he appeared indifferent to his surroundings. Despite every effort of kind and gentle treatment he cried and begged to be left alone. Warm water baths at 85° F. were ordered. His temperature on each occasion rose to 102° F. and his pulse to 140. He expressed a fear of handling and of the water. For these reasons the baths were discontinued. He was then placed in a complete body and extremity cast. A balanced diet was ordered, but he ate very little. One of the commercial malt extracts rich in vitamins was given three times a day. He soon began to eat all his food. *Fig. 2* shows the same boy three months later. There is a decided increase in weight, the skin has regained its color and tone. His expression is happy. During this interval function returned to the right arm, neck and spine.

We were surprised to find that frequent changes of cast were necessary because of increasing weight inside them. While the majority of these patients regained their normal nutritional status in three to six months, some have been as long as a year. Two have as yet to show improvement.

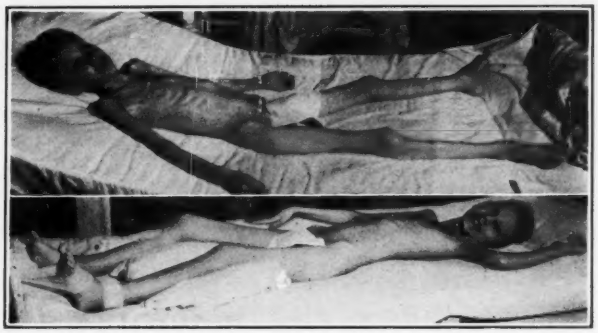

Fig. 1 (Top). Severe case of undernourishment.
Fig. 2 (Bottom). Same case three months following balanced diet.

A comparison of nutrition and function is of interest. Those cases which showed a return of nutrition within three months, likewise responded with a return of function at that time. The same is true in those cases which required longer time to put on weight. The two cases with no nutritional improvement have no functional return.

Nutrition and resistance are closely linked. This resistance of which we speak is called by Aycock[16] "autarcesis." By this he means the power to resist which lies within oneself without outside assistance. During the recovery period the resistance of the poliomyelitic cases was compared with that of other children who were considered normal. We learned that heat, impetigo, childhood diseases and streptococcus infections were more frequent and more severe in the poliomyelitic than in the normal child. These conditions abated with improvement of the nutritional state.

Certain specific considerations are recognized and have been considered a result of impaired circulation. It was present in two cases. Both had swelling, cyanosis and coldness of the part. Both cases have cleared up. The most outstanding type of swelling found in our series was, we feel, a result of lymphatic dysfunction. This we believe is the result, in part, of the flaccidity of the muscles and a loss of the milking action of the acting muscle fibers. This type of swelling is hard and brawny and does not pit on pressure. It does not subside with elevation of the part and is not associated with cyanosis. *Fig. 3* shows this type of swelling which involved the entire body. The swelling is so severe that the gluteal creases appear as constricting bands. The same picture is seen in the arms.

A fear of muscle atrophy and joint stiffness has led orthopedic surgeons to institute physical therapy early. Disappearance of muscle tenderness has been the indication for the beginning of such treatment. Contrary to the popular belief, the muscles of our cases did not atrophy with prolonged rest in circular plaster casts. When nerve function returned, the muscles were found to be well developed and strong. No stiff joints occurred in this series. It has been our observation that when joint stiffness occurs it is not the result of prolonged rest in plaster casts but occurs from some other cause. That muscles deprived of their nerve supply atrophy from over stimulation is explained by Policard.[18] It is his opinion as well as that of Langley[19] that following section of a motor nerve, the motor placque,

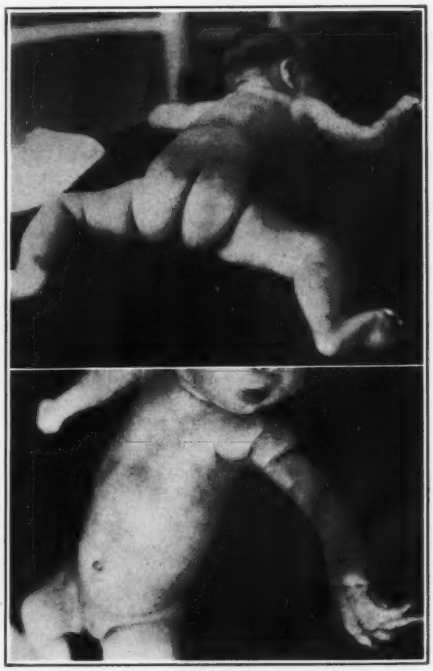

Fig. 3
Case showing lymphedema.

which becomes extraordinarily excitable, causes rhythmic stimulation of the muscle fibers and thus leads to atrophy through fatigue. If this is the case, we obtain muscle atrophy first by physiologic fatigue of the muscle fibers, and, secondly, by applied stimulation with massage, passive exercises and electricity. Muscle tenderness which is present during the first two to twelve weeks is, we believe, more likely a result of muscle fiber contractions from over stimulation of the motor placques and not a result of involvement of the posterior roots as some believe.[20 21]

It appears, therefore, that absolute rest until maximum nerve supply has returned is paramount. Our clinical observations tend to verify this. In the acute stage, systemic rest may be maintained with elixir of phenobarbital. Rest to the spinal cord is obtained with a small pillow under the back to maintain extension of the spine. The extremities are neglected until the acute symptoms have subsided. This usually takes two to three weeks. At the end of this time the weakened and paralyzed muscles are placed in circular plaster of paris casts. The spine is protected by hyperextension in all instances. In cases involving the neck muscles the head is included. The casts are applied in such a manner as to relax the paralysed muscles. Where total paralysis of a part exists, it is placed in a cast in a position of maximum function. In this manner deformity is prevented. Casts are changed at three-month intervals. Muscles showing less than 50 per cent normal function are enclosed in plaster for an additional three months at the end of which time the process is repeated, for as much as a year total time. In a few instances we have continued rest for longer periods but at this time we are not prepared to draw any definite conclusions. Systemic rest is insisted upon. This means absolute quiet and freedom from excitement. Muscle tenderness which is not relieved entirely by casting is relieved by repeated doses of elixir of phenobarbital. Phenobarbital was found to stop the pain in cases in which morphine was ineffective.

Great caution is taken to build up the nutritional state of the patient. Malt extracts rich in vitamins have been effective in stimulating poor appetites. The rest consists of a daily balanced diet of the essentials, carbohydrates, proteins, fats, vitamins and minerals.

Braces are used after 50 per cent function is demonstrable to permit underwater exercises. Also, they are used to permit weight bearing and prevent deformities which casts fail to control.

The dividing line between maximum or adequate benefit from physical therapy and the danger zone of its use is too narrow for comfort of even the skilled technician. Heat, massage, passive motion and electrical stimulation of weakened and paralyzed muscles were used in a group of these cases. These were given very cautiously and by a trained technician. All cases ceased to improve. Many began to lose strength, some of which they later regained by absolute rest. For these reasons we abandoned the use of these methods of treatment. Of all available methods of physical therapy, hydrotherapy offers the safest and greatest benefit. Even this treatment, we feel, should not be instituted until the muscles show at least 50 per cent recovery. This method has been and can be applied successfully by intelligent mothers in the family bath tub.

Its advantages are:

(1) It is more restful than dry heat.

(2) It permits more active exercise with less fatigue.

(3) In active motion of the parts the child automatically refrains from overstretching the muscles.

Exercises out of water are begun when the patient can spend one-half hour in the tub without fatigue. Even then, the exercises are limited to one or two motions of the part. These exercises are gradually increased as muscle strength improves.

The increased frequency with which we are seeing pregnancy complicate this disease demands our attention. The one case which we had that required a cast was totally paralyzed. An ordinary pillow was placed over the abdomen while the cast was being applied, and it was later removed to permit expansion.

The cast was removed when the patient went into labor. It was reapplied two weeks after delivery. No inconvenience was noted. Of interest was the rapid recovery with return of function and nutrition following delivery.

Tables 1, 2 and *3* show the results which have been obtained up to September 1, 1938. This represents twelve to sixteen months of care. While we have listed the involved parts rather than the individual muscle groups, we wish to emphasize that the cases which came under our care showed severe involvement. With only a

few exceptional cases was a single muscle group involved. Only those cases in which all muscle groups of a part have a complete return of function and power are reported as recovered.

From the study of the tables it is to be observed that the earlier after onset that we institute treatment the better are the results. It is to be noted further that paralysis of the lower extremities was less responsive to treatment.

SUMMARY

(1) The principles of prolonged rest are reiterated.

(2) A different interpretation of the cause of muscle atrophy and tenderness and the production of edema is offered.

(3) The connection between shock, nutrition and ultimate recovery is demonstrated.

(4) An analysis of our results of treatment of sixty-three cases observed over a period of slightly more than a year discloses the value of treatment based on these newer conceptions.

Table 1

TREATMENT STARTED FROM ONSET TO ONE MONTH

Twenty-Five Patients

Parts	Paralyzed	Recovered	Per Cent
Arms	16	15	93
Legs	27	20	74
Spine	5	4	80
Abdomen	3	2	66
Face	5	5	100
Neck	3	3	100

In cast 3 to 13 mos., average 7 mos.
Braces 2 to 8 mos., average 5 mos.

Table 2

TREATMENT STARTED FROM ONE TO THREE MONTHS

Fifteen Patients

Parts	Paralyzed	Recovered	Per Cent
Arms	15	9	60
Legs	25	12	48
Spine	7	6	87.7
Abdomen	4	3	75
Face	0	0	0
Neck	2	1	50

In cast 2 to 12 mos., average 7 mos.
Braces 1 to 6 mos., average 4 mos.

Table 3

TREATMENT STARTED FROM THREE TO SIX MONTHS

Twenty-Three Patients

Parts	Paralyzed	Recovered	Per Cent
Arms	12	7	59.3
Legs	37	11	29.7
Spine	4	2	50
Abdomen	4	3	75
Face	0	0	0
Neck	2	2	100

Cast 3 to 9 mos., average 4.5 mos.
Braces 3 to 9 mos., average 6.4 mos.

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DISCUSSION (*Abstract*)

Dr. Newman (closing).—I feel the two important factors in the treatment of poliomyelitis are first, rest, and second, nutrition. Rest in circular plaster casts I feel is more advantageous than that obtained with splints. It provides better immobilation and lessens the temptation to give physical therapy early.

METASTATIC CANCER IN THE LYMPH NODES OF THE NECK*

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The management of metastatic cancer always presents a discouraging problem. Once cancer has spread beyond its primary site, the chances of a cure depend upon the ability to deliver to the cancer cells a dosage of irradiation sufficient to destroy them. In many regions of the body this is an impossibility. In the neck, however, the distribution of lymph nodes is such that one is better able to attack the cancer cell and deliver a dosage of irradiation calculated to destroy it. This is possible because of the accessibility of the lymph nodes to surgical exposure and the ease of radium implantation.

No section of the body offers such hope of cure of metastatic carcinoma as does the neck. Once cancer has spread to the lymph nodes in the neck, the problem becomes even greater than the consideration of the treatment of the primary intra-oral cancer, because all labor is lost unless one is able to destroy the metastatic cancer.

Every student of malignant diseases recognizes that intra-oral cancer is a disease revealing varying structures and degrees of radiosensitivity; all of them, however, respond to a sufficient irradiation dosage, whether it be radium or x-rays. When cancer has spread from its primary site to the lymph nodes there is immediately a great difference in the degree of radiosensitivity of the cancer cell. Stewart says that adult squamous carcinoma tends to occur on the lip, the dorsum, tip, and lateral borders of the tongue, the alveolar ridges, the hard palate, the buccal mucosa, the pharyngeal vault and true vocal cords, and that as a group they are relatively radioresistant, requiring irradiation dosage approaching the tolerance of normal structures, either in the form of interstitial or moulage application. Carcinomas of the anterior floor of the mouth are likely to be moderately anaplastic and tend to be relatively radiosensitive, frequently requiring supplemental interstitial irradiation for complete control. Carcinomas of the hypopharyngeal region, tonsil, base of tongue and soft palate are moderately to highly radiosensitive.

There is considerable difference of opinion regarding the radiosensitivity of the cancer cell when it has spread to the neck lymph node. There is a preponderance of evidence, however, which supports the belief that lymph node cancer has usually a lower degree of radiosensitivity than the parent cell, although we must recognize that there are occasional exceptions to this rule. The radiosensitivity of metastatic cancer surely depends largely on the type of the primary cell. Pack points out the fact that the transitional cell caracinoma and lympho-epithelioma frequently spread to groups of nodes rather than to a single node and that such metastases are almost always very responsive to irritation.

In the writer's experience and according to Pack, cancer in the nodes secondary to carcinoma of the lip, tongue, cheek, alveolar ridge, or buccal mucosa can rarely be controlled by either form of external irradiation, however fractional, when used alone. Metastatic cancer in the neck nodes frequently forms keratin and some becomes decidedly desmoplastic with fibrotic changes. Moreover, there is marked tendency to liquefaction and central necrosis with cavity formation. In such nodes one could not expect other than increased irradiation resistance. Once cancer has perforated the node capsule and invaded the fascia, it almost certainly becomes radioresistant regardless of histologic characteristics. The lymphatic areas of the neck extend from the base of the skull to the clavicle and a review of any one of the standard anatomical charts of the distribution and intercommunication of cervical lymphatics will reveal how easily the manner of extension may be different. The likelihood of bilateral metastases to the lymph nodes from a strictly unilateral growth must be considered when planning any form of treatment. Cancer of the lip, tip and lateral border of the tongue, buccal mucosa, anterior floor of the mouth and alveolar ridge usually spreads to the submental and submaxillary group of nodes of the same side as the primary growth. Cancer of the base

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*Read in Section on Radiology, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

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of the tongue, tonsil and epipharynx spreads to the cervical nodes.

Cade has called attention to the late development of cancer cells deposited in the neck nodes long after the disappearance of the primary growth in the mouth and to the fact that the systematic microscopic examination of all lymph nodes excised shows that there is a period of latency which may last eight to twelve months, during which time ordinary clinical methods of examination cannot reveal the presence of malignant lymph node deposits.

The full importance of this fact must be realized. Every patient who has been treated for intra-oral cancer should be carefully examined at frequent intervals so that if metastatic nodes do appear they can be discovered and treated without delay. Every patient should be instructed to be on the lookout for the appearance of enlarged nodes in the neck. Frequently the patient will discover a lymph node which was not present at the time the examiner saw him a few weeks before.

Quick believes that a healthy lymph node can digest and reabsorb many tumor emboli and that only an occasional embolus gains foothold and grows within the node of lodgement; and furthermore that the tumor cells gain headway more readily in a lymph node of lowered resistance in which there are inflammatory changes. The conservation of the neck nodes for their given purpose seems wise.

The diagnosis of metastatic cancer in nodes may be difficult; in the absence of palpable nodes one concludes that no metastasis is present. A clinical diagnosis of metastatic cancer is usually made when a palpable node is found which is firm or hard, nonpainful and increasing in size. Frequently one finds enlarged nodes which are due to inflammatory changes; these nodes are tender to palpation and usually decrease in size as the oral infection and primary lesion decrease. Aspiration biopsy has, in my hands, proven of tremendous value in distinguishing between an inflammatory node and metastatic cancer. A negative aspiration should be repeated.

Surgical treatment of neck nodes has been employed for many years and in the hands of skilled operators brilliant results have been achieved. Surgery of metastatic nodes has become limited in its scope; no longer does one see the complete operation known as Crile's dissection. Duffy has given the following outline of the indications and contraindications for neck dissection:

INDICATIONS	CONTRAINDICATIONS
(1) Primary lesion is controlled.	(1) Primary lesion is uncontrolled.
(2) Primary lesion is limited to one side of oral cavity.	(2) Primary lesion extends to or beyond midline of oral cavity.
(3) Primary lesion is shown to be of highly differentiated cell type.	(3) Primary lesion is shown to be of undifferentiated cell type.
(4) Cervical metastases are present and limited to one group of nodes or nodes in two contiguous cervical triangles.	(4) No metastatic nodes are present.
(5) Capsule of nodes is not infiltrated by carcinoma.	(5) Capsule of node is infiltrated by carcinoma.
(6) Opposite side of neck is free of metastases.	(6) Cross or bilateral cervical metastases are present.
(7) No distant metastases are present.	(7) Distant metastases are present.
(8) Patient is in good general health. All these indications must be present for dissection.	(8) Patient is in poor general condition. Any one of these contraindications precludes radical dissection.

Duffy, in a study of 983 cases of oral carcinoma, revealed that 79.95 per cent of cases with no nodes on entrance did not develop nodes. On this basis alone one is not justified in doing routine neck dissections or external irradiations.

The writer contends that prophylactic neck irradiation with high voltage x-rays or radium pack is a wasted procedure and may actually produce damage to the neck structures and render future treatment of metastatic nodes less efficient. No one would dare to claim that it is possible to deliver to this large volume of tissue a dosage of external irradiation sufficient to destroy cancer cells.

The question as to when one should institute the treatment for neck node metastases cannot be answered by a single example. Each patient presents an individual problem. However, it is needless to say that treatment should be instituted at the earliest possible moment. As a general rule, a patient with a primary intra-oral cancer, badly infected, and with an enlarged node, I feel that it is better to have the primary lesion under control so that the oral sepsis is reduced and any inflammatory changes

in the node may be lessened, thereby promoting a better natural defense of the node. As soon as this has been accomplished, treatment is started. In early cases where the primary lesion is small, with little or no intra-oral infection present, and cure of the primary focus is probable, the metastatic node is usually attacked a few days after the completion of irradiation of the primary lesion. When a metastatic node is discovered after the healing of the intra-oral cancer, treatment is started as soon as a positive diagnosis has been made.

In the writer's clinic the surgical treatment of cancer in neck nodes has been abandoned in favor of irradiation. When a patient with oral carcinoma develops an enlarged neck node, an aspiration biopsy study is done immediately to determine its benignancy or malignancy. If cancer cells or epithelial scales are reported and the node is a single one apparently not more than 2 or 3 cm. in size, fairly freely movable, and therefore apparently has not ruptured through the capsule, and the primary tumor is epidermoid cancer, the node is treated solely by the implantation of radium seeds.

The successful distribution of radium implants necessitates a simple surgical approach to the node. This is done with ease under local anesthesia, with as little dissection as needed, disturbing the bed and blood supply as little as possible during the exposure of the node. Once this is done the node is aspirated and all of the fluid in the node is withdrawn before implantation is started. This is regarded as a highly desirable procedure because almost all of the nodes will reveal some liquefaction distending the node, following withdrawal of which there will be less volume of tissue. Interstitial implantation of radium or radon seeds is now done. I use the small radium element implant which was designed by Pack. It measures 7.5 mm. in length with a wall thickness of 0.3 mm. platinum and contains 1.3 mg. radium; it is only a fraction larger than the removable radon implant. It has the advantage, however, of being immediately available. The implants are inserted into the node and its bed with a trocar implanter; the spacing usually being 1.5 cm. equidistant and attempting to place them in theoretical arrangement of spheres, so that each implant will sterilize one c. c. volume of tissue. It follows, therefore, that sufficient implants should be utilized and that these should be left in the tissue long enough to deliver the millicurie hours necessary to produce between seven and ten erythema doses as calculated by Mrs. Quimby and her co-workers at Memorial Hospital. The skin incision is completely closed and the implant threads are brought out at each corner of the wound and act as a drain.

Small neck nodes, the parent cell of which is

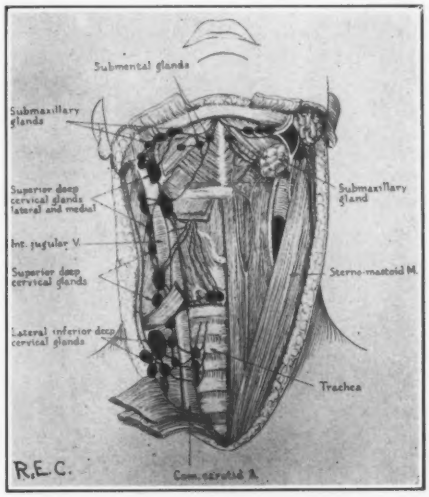

Fig. 1
Distribution of cervical lymph nodes.

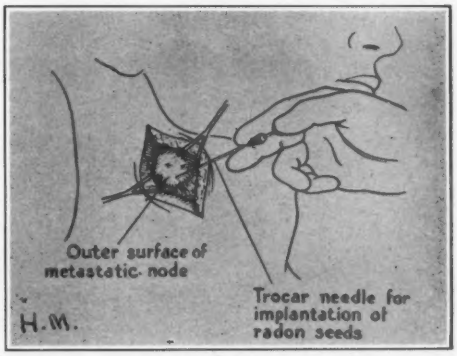

Fig. 2
Showing method of implanting radium into nodes.

proven to be transitional cell or lympho-epithelioma, can frequently be treated by high voltage x-rays alone, provided small fields are employed and the fractioned dosage runs up to 7,000 or 8,000 r. With such dosage the field cannot exceed 4 or 5 cm. It is agreed that occasionally a very small metastatic squamous cancer node can be sterilized by high voltage x-rays alone, employing 2.5 to 3 cm. fields.

The management of very large metastatic nodes, which unquestionably have penetrated the capsule, invading the surrounding tissues and muscle sheath, must be treated by a combination of external high voltage x-rays and interstitial radium needles. High voltage x-ray treatments in fractioned dosage of 200 r daily over the neck node area are administered until a total dosage of 3,500 r is reached and immediately transcutaneous implantation of radium needles, containing two or three cells 16 mm. in length, is done. These needles are inserted deep into the node area in two or three planes in sufficient number and left in place long enough to bring the metastatic cancer area dosage up to not less than seven to ten erythema doses as calculated from the Quimby charts. One is frequently rewarded with surprising results following such a method of handling advanced nodes. When the node has undergone softening and liquefaction which reaches to the surface of the skin, it is wise to do an incisional drainage and pack the cavity with iodoform gauze before the radium needles are inserted; at this stage of the disease, however, all chances of obtaining a cure become seriously handicapped.

QUANTITIES OF RADIATION FROM INTERSTITIAL SOURCES NECESSARY TO DELIVER SPECIFIED MINIMUM DOSES IN VARIOUS VOLUMES*

Threshold Erythema Doses	Volume, Cc										
	10	20	30	40	60	80	100	125	150	200	250
	Millicure, or Milligram Hours										
1	275	380	470	530	650	750	845	955	1,060	1,250	1,410
2	550	760	940	1,060	1,300	1,500	1,690	1,910	2,120	2,500	2,830
3	825	1,140	1,410	1,590	1,950	2,250	2,535	2,865	3,180	3,750	4,240
4	1,100	1,520	1,880	2,120	2,600	3,000	3,380	3,820	4,240	5,000	5,660
5	1,375	1,900	2,350	2,650	3,250	3,750	4,225	4,775	5,300	6,250	7,070
7	1,925	2,660	3,490	3,710	4,550	5,250	5,915	6,685	7,420	8,750	9 900
10	2,750	3,800	4,700	5,300	6,500	7,500	8,450	9,550	10,600	12,500	14,100
	Millicuries Destroyed										
1	2.1	2.9	3.5	4.0	4.9	5.6	6.4	7.2	8.0	9.4	10.6
2	4.2	5.8	7.0	8.0	9.8	11	13	14	16	19	21
3	6.3	8.7	10.5	12	15	17	19	22	24	28	32
4	8.4	12	14	16	20	22	26	29	32	38	42
5	10.5	14	18	20	24	28	32	36	40	47	53
7	15	20	24	28	34	39	45	50	56	66	74
10	21	29	35	40	49	56	64	72	80	94	106

*These doses are for needles to be left in place four days or longer. If they are to be removed in two or three days, all quantities of radiation should be about 10 per cent less. A platinum filter of from 0.3 to 0.5 mm. was used. —Quimby.

Chart 1

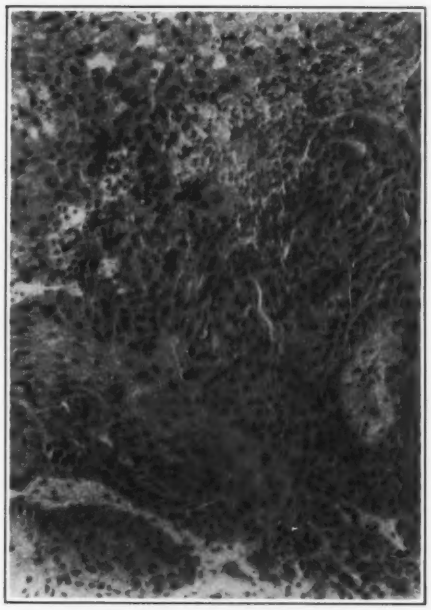

Fig. 3, Case 1
Squamous carcinoma of tongue.

Case 1.—C. W. E., a white man, aged 45, had a squamous carcinoma Grade II of the left anterolateral margin of the tongue. Its duration was about one month. The growth was approximately 1 cm. in size, without clinical evidence of metastatic nodes. It was treated with seven 1 mg. platinum radium needles, interstitially criss-cross into the base of the tumor, a total of 1,176 mg. hours. There was a clinical cure. Four months later an enlarged deep cervical node in the left neck was discovered. Aspiration biopsy revealed metastatic epidermoid carcinoma. This was treated by surgical exposure of the node and implantation of ten gold radon implants, 2 mc. each. Three months after treatment of the node there was evidence of clinical cure and there has been no recurrence to this date.

Case 2.—H. B. C., a white man, aged 55, had a transitional cell carcinoma of the right paranasal sinus (frontal). Treatment consisted of cross-fire high voltage x-ray therapy to the tumor bearing area, totaling more than 4,000 r to each field. There was a clinical cure. One year later the patient discovered a small node in the right submaxillary region. Examination only a few weeks previously revealed no enlarged node. Aspiration biopsy of the node showed metastatic transitional cell carcinoma. Treatment consisted of intensive high voltage x-ray therapy to the node, using 2.5 cm. port and administering 2,200 r. Immediately upon completion of this treatment ten radium element platinum implants containing 1.3 mg. were inserted into the node, after surgical exposure under infiltration anesthesia. Three months following this there was complete disappearance of the nodes and the patient remains well today.

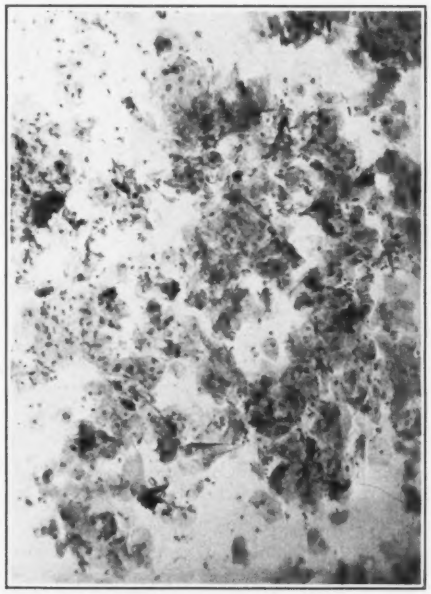

Fig. 4, Case 1
Aspiration biopsy from node.

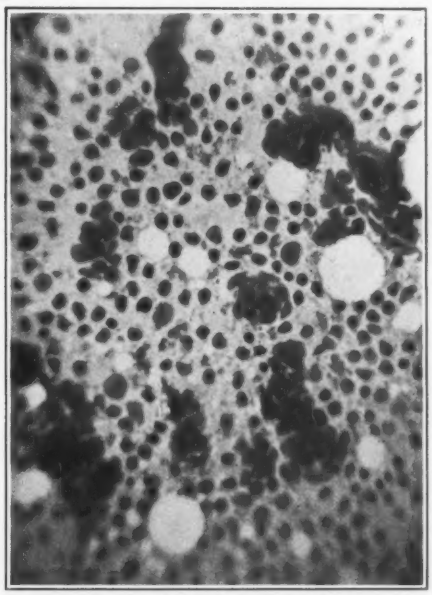

Fig. 5, Case 2
Aspiration biopsy from node, transitional cell carcinoma.

Fig. 6, Case 3
Epidermoid carcinoma of tongue.

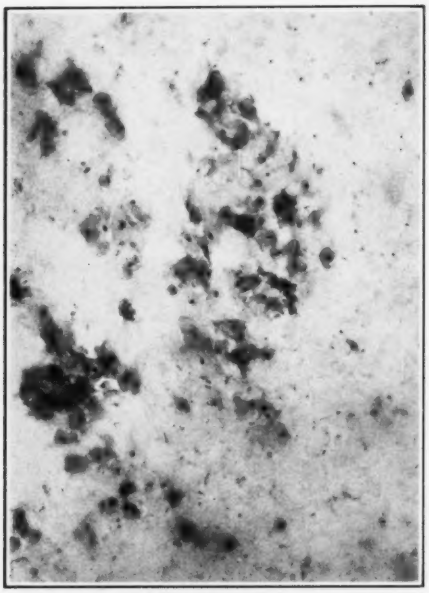

Fig. 7, Case 3
Aspiration biopsy from node.

Case 3.—D. L. S., a white man, aged 54, had an epidermoid carcinoma Grade II of the left base of the tongue. There was no clinical evidence of metastases. Treatment consisted of high voltage x-rays, using 7.5 cm. portal to the base of the tongue, and 200 r to each side of the neck daily until 23 to each had been administered. There was a clinical cure. Ten months later an enlarged deep cervical node in the left neck was found, and aspiration biopsy revealed carcinoma. The node was fixed and apparently 2.5 cm. or more in size with every evidence of having perforated the node capsule. Preliminary high voltage x-ray therapy was administered to the node area, using 5 cm. port, 200 r daily until 16 treatments had been administered. Immediately thereafter four 2 mg. platinum radium needles and four 3 mg. platinum radium needles were inserted transcutaneously into the node and bed and left *in situ* 100 hours (2,000 mg. hours). One year later there was no evidence of recurrence.

DISCUSSION (*Abstract*)

Dr. W. E. Eastland, Oklahoma City, Okla.—I want to thank Dr. Edwards for presenting a subject that we as radiologists encounter daily, each case being a distinct challenge to our ingenuity.

Many of us had the opportunity of hearing Duffy's paper at the International Congress of Radiology, giving his indications and contraindications for neck dissection. There are radiologists who are opposed to any surgical interference of neck metastases. Very recently I have observed Coutard's work over a period of time, and saw him point out extensions or recurrences of cancer in the skin of the neck at sites where an incision had been made. He stressed this point greatly, thereby indicating his disapproval of operative procedure for neck nodes.

There must be a happy medium as to which route is taken, surgical or radiological. In order to arrive at such a happy medium we must pay attention to some of the guide posts indicating our path. From a broad viewpoint it is often stated that in highly differentiated tumors the patient may fare better by surgical means, providing all of the indications set out by Duffy have been observed. Particularly it seems wise to comply with the idea that the primary lesion must be controlled before surgical removal of the nodes, since Quick believes they have the power of often absorbing and digesting tumor emboli. It appears reasonable to believe that more cures could be obtained if Duffy's indications were followed. Unfortunately, however, it is quite difficult to find many surgeons widely experienced in cancer surgery who are especially competent in neck dissection. Moreover, but few are impressed with the significance of whether the primary tumor is differentiated or undifferentiated. Hence, with these difficulties in contacting men who are both informed and skilled in this type of surgery, more and more it appears better to consider a radiological approach to even the differentiated tumor.

While mentioning the differentiation of intra-oral cancers it might be pointed out that aside from the information found in the paper as quoted from Stewart concerning tumor differentiation on an anatomical basis, other clinical observations could be made. Not only are epitheliomata on the dorsum and borders of the

anterior one half of the tongue usually well differentiated, but they also have this interesting character: the primary differentiated tumor is relatively large with metastatic lesions that are small. The undifferentiated cancer is characterized by a primary tumor that is relatively small, but with large metastatic nodes.

Great attention should be given the anatomical location of metastatic lesions, as there are usually certain areas in which metastases occur, depending on the site of the primary lesion. Hence, not only does the relationship in size but also the location of the metastatic tumor assist in forming clinical judgment as to the degree of differentiation and radiosensitivity. Such information is a valuable aid, as it is not wise to obtain a biopsy of an intra-oral tumor unless it is ulcerated.

Although Dr. Edwards advises aspiration biopsy for nodes, and this has been done extensively at Memorial Hospital, there are others who oppose this method, regarding it as dangerous and believing that any instrumentation is likely to stimulate growth of the cancerous node. Other points against aspiration biopsy are that not infrequently the microscopic examination may be negative, which gives a false security, or otherwise necessitates further puncturing. Moreover, there are but few pathologists who are accustomed to examining specimens obtained by this method. Both Ewing and Coutard are opposed to node dissection for biopsy.

Although there are quite a number of workers who believe that a prophylactic neck radiation is desirable, I agree with the author that such a procedure is illogical. The technic that the author employs in using deep x-ray and radium interstitially, varying with different clinical findings, is very interesting, and I have no doubt that he obtains many nice regressions in differentiated nodes. I believe that by far and wide, however, all of us meet with much disappointment in such tumors. It is meritorious that such work is being carried on and gradual gains are being made. Undoubtedly, most of our favorable results by radiation on neck nodes are being obtained in the early treatment of the anaplastic or highly undifferentiated tumor that fares poorly by surgery.

Dr. Charles Martin, Dallas, Tex.—This subject is one in which I have had a lively interest for many years. Radiologic procedures are now very effective in the treatment of primary carcinoma of the lip, face and mouth, even when they are quite large, but no entirely satisfactory plan for dealing with metastases in the cervical lymph nodes has, as yet, been devised. It is true that individual nodes will regress when they are implanted with the small seeds which Dr. Edwards has described, but all too often a new group appears just below those treated on the other side of the neck a few months later.

Since some procedure capable of eliminating carcinoma from large areas of lymphatic distribution in the neck is highly desirable, we have been experimenting in the Baylor tumor clinic with a somewhat different plan. Very long, weak radium needles are inserted into the gland bearing tissues of the neck parallel to one another so as to irradiate a sheet of tissue beginning well above the involved nodes and extending well below them. These needles are left in place for seven days and during the same period a total of 2,100 r is administered to the needled region, using high voltage x-rays given in divided doses. This is done in an effort to increase and more evenly distribute the effect without producing irreparable damage to the skin. A small group of patients treated in this way during the past four years has shown very satisfactory regressions which we believe will be permanent. This procedure is now being used routinely with carcinoma in the mouth and large carcinomata of the lip even when no lymph nodes are palpable.

CANCER OF THE LARYNX AND ITS TREATMENT BY TOTAL LARYNGECTOMY*

By SIDNEY ISRAEL, M.D.
Houston, Texas

In spite of the many admonitions in the literature as to the potential seriousness of the symptom, persistent hoarseness, we all too frequently see patients with advanced laryngeal invasion by malignant growths. This fact is a great indictment against certain members of the medical profession who are partly responsible for the delay in early diagnosis or investigation.

The incidence of cancer of the larynx reported in the literature shows that approximately 98 per cent of cases occur among the white race and about 2 per cent among negroes: 91 per cent among males and about 8 per cent among females. In the fifth decade of life, about 30 per cent occur, and 45 per cent of patients have reached the age of sixty years. In a series of cases reported by Tucker, vocal abuses were a predisposing cause in 41 per cent and tobacco in 12 per cent. In a series of 102 cases reported by Orton, 18 used alcohol moderately and 38 per cent used tobacco to excess, a little better than one-third of the patients. These percentages are in keeping with my own experience, with the exception that I find that a nonsmoker with cancer of the larynx among men is relatively infrequent. The greatest percentage of cases of cancer of the larynx are classified as intrinsic, because of the greater frequency of cancer situated in, or about, the vocal cord. In Orton's series, 75 per cent of the cases were intrinsic.

Carcinoma of the squamous-cell type is the most frequent. Basal-cell carcinoma is seen occasionally and sarcoma even more infrequently; likewise, adenocarcinoma. The principal symptoms of early cancer of the larynx are, in their

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

order of frequency and importance: hoarseness without pain, vocal fatigue, and laryngeal discomfort. These particularly apply to any lesion involving the vocal cord, which is the part most frequently affected. The obstructive symptoms, dyspnea and dysphagia, are usually found in advanced laryngeal involvement or in lesions located extrinsically. These symptoms vary in their severity, and depend upon the duration of the disease and the extent of the involvement. Hoarseness, however, is the chief, and generally the first, symptom in all cases of intrinsic laryngeal malignancy.

The importance of early diagnosis cannot therefore be overemphasized. Laryngeal examination with a mirror and the early differential diagnosis of tuberculosis, syphilis, benign growths, and malignancies should be made promptly. In assuming responsibility for the patient's diagnosis and treatment, a full and complete history is important. Complete blood study, x-rays of the sinuses and chest are necessary in the development of a diagnosis, keeping in mind in this regard that a chronic sinus disease will oftentimes produce sufficient laryngeal irritation to cause hoarseness and other symptoms affecting the upper respiratory tract. The recognition or exclusion of syphilis by blood examination is necessary. Syphilis and cancer may be present in the same patient.

The statement that vocal cord fixation must be present in laryngeal cancer has been rendered unorthodox in the light of greater knowledge in this regard. A movable cord is seen frequently with a small malignant lesion.

After a careful and complete study, the final diagnostic measure is a well performed and properly interpreted biopsy. A biopsy has some limitations, but when these are understood and biopsy is repeated if necessary, positive findings are dependable. From the diagnostic findings, one with experience can properly suggest the therapeutic measure which offers to the patient the greatest hope for recovery. The decision is then whether or not treatment shall be surgical or nonsurgical. Of the nonsurgical measures, x-rays and radium are our sole means of attack.

Because of the nature of the laryngeal cancer and its location and, in the majority of instances, the fact that it is intrinsic, only surgical means of attack should be considered: either thyrotomy, laryngofissure, hemilaryngectomy, or a total removal of the larynx.

In dealing with intrinsic laryngeal malignancies, the fact that 96 per cent of these are of the squamous-cell type practically eliminates x-ray and radium from consideration. Radium and x-rays in cases considered inoperable, either because of the type of lesion, extent, or location, have produced some favorable results, especially by the method of Coutard of protracted fractional doses. The decision to deal with cancer of the larynx by surgery is an important one and should call forth a careful study and intelligent decision through the teamwork of the internist, laryngologist and radiologist. It is just as ridiculous to treat a surgical case medically or with irradiation as it would be to treat a medical case surgically and this should be kept in mind.

One's method of surgical approach in dealing with cancers of the larynx should be paradoxically both radical and conservative: radical with reference to complete removal of the malignancy, and conservative in regard to the safety and postoperative welfare of the patient. When any doubt exists, total laryngectomy is the operation of choice, and when indicated it is to be preferred to any other type of surgical attack. These indications, however, should be clearly defined and well advised. When an operation other than total laryngectomy is selected, there should be no doubt as to the diagnosis of the extent or the limit of the growth. It is a general assumption that only one-third of the growth can be seen, therefore, the wisdom of thorough and complete extirpation. A valuable diagnostic aid as to the extent of involvement and orientation of the growth is a good x-ray of the larynx. In selecting the various surgical measures for dealing with laryngeal cancer, conservation of tissues should always be kept in mind and where the lesion is situated on one vocal cord, and the invasion is not extensive, thyrotomy, laryngofissure, or hemilaryngectomy should be performed. Total laryngectomy is indicated when the growth has invaded the anterior commissure and encroaches on the opposite side, spreading beyond the vocal cord, involving the arytenoid, the ventricular band, the epiglottis, the subglottic region, or extending around the anterior commissure. Total laryngectomy is also indicated when there is a marked fixation of the vocal cord and deep invasion on the affected side. Because of the doubt as to the extent in these instances, it is highly important that there be a thorough and complete extirpation. The incidence of recurrences following total laryngectomy is far less than following a more conservative operation. MacKenty reported only 3 per cent

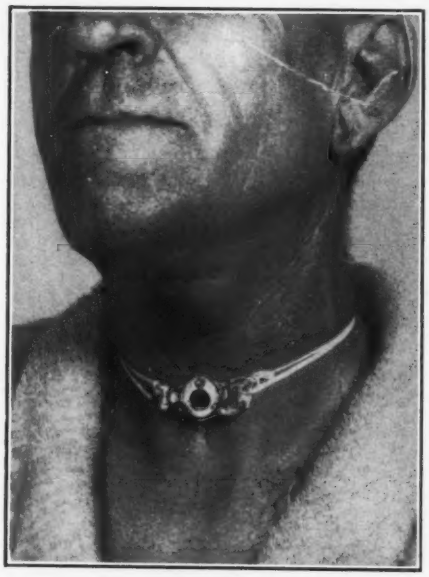

Fig 1
Carcinoma of the larynx, grade 3; total laryngectomy. Appearance of wound two weeks after operation.

of recurrences after total laryngectomy. Because of the small lymphatic drainage of the larynx, the tumor is enclosed in a cartilaginous box and thus metastasis of intrinsic laryngeal cancer is generally very low, and growth frequently is slow. When the lesion is limited to the vocal cord, metastasis is even more infrequent. Therefore, the importance of early diagnosis and prompt removal by conservative operation cannot be overemphasized and is one of the reasons for this paper. All of these facts, together with the mental and physical equipment of the patient, should influence the surgeon in his recommendations or therapy. It is important that a thorough discussion should take place as to what the patient is to expect in the matter of cure or end result, as well as his social and economic status following recovery.

Operative mortality in the light of modern surgical methods and technical skill should be less than 2 per cent under favorable conditions. The grade of malignancy, the extent, and duration, naturally influence recurrences. The incidence of cures runs as high as 80 per cent following laryngofissure operation and from 50 to 60 per cent following total laryngectomy.

In the choice of surgical procedure, the one-stage operation, as originally advocated by MacKenty, is undoubtedly the one of choice, after one is assured that the patient is an excellent surgical risk, and that the entire operation can be dispatched with a minimum of shock and time consumed. When the patient is aged and either a fair surgical risk or a poor one, a preliminary tracheotomy or a two-stage operation is safer. The importance of preoperative preparation of the patient is especially stressed, together with the obtaining of blood donors for transfusion. In the preoperative preparation, no measure conducive to the welfare and prompt recovery of the patient should be overlooked, beginning with dental hygiene and cleanliness. Every vestige of a dental infection should be eliminated before operation. In all patients, the blood chemical and kidney function tests should be done.

The basal anesthetic of choice has been tribrom ethyl alcohol by rectum. The dosage employed is 100 to 120 milligrams per kilo of body weight. This basal anesthesia is supplemented by a small quantity of ether. It is my experience that in addition to the satisfaction and safety of this anesthetic, the patients are spared mental excitement or depression at the time of operation.

Fig. 2
Carcinoma of the larynx, grade 2; total laryngectomy. Appearance of wound two weeks after operation.

The safe technic of total laryngectomy as developed by MacKenty, whose results, operative technic and mortality have been most enviable, has been followed by me chiefly, with some modifications of my own. The "T" incision or modification of Gluck's original incision has offered me ample exposure. There are times when a simple vertical incision would suffice, but I can see no wisdom in sacrificing safety and thoroughness in order to limit oneself to a small vertical incision. Meticulous care and thoroughness in eradicating every vestige of the growth, together with any involved lymph nodes, should be one's chief concern. The decision as to the exact method of removing the larynx must be settled by individual preference. There are instances in which it seems easier to sever the larynx from below and dissect upwards and there are times when the opposite seems preferable. One must be guided by the problem present and one's own preference. In the closing of the wound, ample drainage is provided for, but care is taken to prevent the use of too many drains which would have a tendency to delay healing and spread infection.

In no branch of surgery is there a greater opportunity to exercise one's surgical skill or dexterity, judgment and knowledge of pathology to the fullest extent, to avoid unnecessary trauma and local tissue necrosis. Without these attributes, for the best interest of the patient, one had best turn his attention to other fields.

The importance of proper postoperative care should not be overlooked. A high caloric diet and a high vitamin intake should be employed. Proper care by skilled attendants is all important. The patients are permitted to sit up in bed generally on the second day and they are out of bed on the fourth day. One of the important details of postoperative care is to prevent the wound secretions from remaining in or on the wound, since they delay healing. On the day following the operation, dressings are removed permanently and the wound exposed to the air. Any secretion is removed by suction through a glass tube attached to a rubber bulb or aspirating machine. This step in the postoperative care has been most important and is responsible for prompt healing in the cases operated upon. It is almost an impossibility to keep dressings dry on a wound, particularly if there happens to be much drainage, but with a skilled nurse, the secretions are aspirated as soon as they appear, and with the help of the atmosphere, the wound is kept dry. Union is generally primary, thereby shortening disability. These patients are by no means unhappy objects of sympathy, nor do they become melancholy introverts. It is amazing how quickly patients learn to utilize the artificial larynx for speech and many even develop the stomachic voice without difficulty. They are quickly adapted to the changed order of speech and look forward to the future with normal optimism and confidence.

CONCLUSIONS

(1) Hoarseness persisting over a period of three weeks should be looked upon as a potential malignancy until proven otherwise. Persistent laryngeal discomfort should likewise be held under suspicion.

(2) Total laryngectomy should be done without hesitancy in all cases of intrinsic laryngeal cancer beyond the scope of laryngofissure. It is the surgical consultant's duty to make this differentiation.

(3) The early removal of all dressings from the wound is a distinct forward step in the postoperative care, since it encourages primary union.

(4) Surgery, when indicated, offers the greatest hope for cure in dealing with cancer of the larynx.

(5) The cooperation of the radiologist in executing postoperative irradiation is important. The entire consequences and reasons therefor should be explained to the patient before operation. What the patient must undergo and what he can expect justifies the use of the highest developments in the surgical art.

DISCUSSION (*Abstract*)

Dr. Murdock Equen, Atlanta, Ga.—Dr. Israel has presented slides illustrating the classical laryngectomy operation and his method of laryngeal drainage. A review of the literature shows that the usual method of laryngeal drainage is in the midline or laterally by the use of four tubes for counter drainage. We presented slides showing how the drainage can be taken to the sides by a method which we have devised, thus preventing secretions from entering the trachea; making the danger of pneumonia less and the patient far more comfortable. Note that there are two through-and-through tubes as compared with the four customarily used. These tubes remain *in situ* instead of working out as often happens when four tubes are used. The muscular activity in this area plus the closure of the wound tend to force tubes out, thus defeating the first principle of surgery, drainage. This is a better method of taking care of the enormous dead space encountered after a total laryngectomy, as the presence of these through-and-through tubes, which are perforated, per-

mits drainage and irrigation of the laryngeal space by various antiseptics.

Dr. Millard F. Arbuckle, St. Louis, Mo.—In this day and age with the tremendous increase in our knowledge of the value of radiation therapy as a means of treating cancer, it is surprising to hear a paper which fails to give due consideration to this method of treating cancer. Dr. MacKenty was a very progressive man, and if he were still alive I feel sure that his attitude toward radiation therapy would have changed with that of most of us. If cancer of the vocal cord can be cured by laryngofissure, then it is self-evident that it can be cured by laryngectomy, and naturally if a man does laryngectomy for every cancer of the larynx, his number of cures and his mortality rate will be better than will the figures of the man who reserves laryngectomy for those cases which cannot be properly treated by laryngofissure. In view of the fact that in over 80 per cent of cases of cordal cancer we may expect a lasting cure without loss of function after laryngofissure, it seems to me that there is no choice between laryngofissure and laryngectomy for treatment of this type of cancer of the larynx. When it comes to selecting treatment for late cancer of the larynx, the question is entirely different, and the decision between the use of radiation and surgery is one which no one is justified in making without the most serious consideration and without consultation with a competent radiologist and pathologist.

Dr. Wendell G. Scott, St. Louis, Mo.—I have enjoyed the very interesting paper by Dr. Israel, which represents the extreme views held by a relatively small group of laryngologists who are treating cancer of the larynx.

There are three points which make it very difficult to compare the results achieved by surgery and those obtained by roentgen therapy in the treatment of cancer of the larynx. First, there has been a wide variation in the grouping of the structures classified as intrinsic and extrinsic cancer. A uniform definition is important, particularly in roentgen therapy, since cancers arising in structures but a few millimeters apart may differ greatly in their symptomatology, clinical course, prognosis, radiosensitivity, and curability. Second, the laryngologists and the radiotherapists do not handle the same types of cases. Of all the laryngeal malignancies seen by the laryngologist, about 75 per cent are intrinsic, which is, of course, the most favorable type of lesion. With the radiologist the converse is true in that about 75 per cent of his cases are extrinsic and are the more advanced and refractory types. Third, among laryngeal surgeons there are no universally accepted indications to determine the cases that are suitable for the crippling operation of total laryngectomy. This is shown by the great variation in the percentage of patients subjected to a total laryngectomy by different surgeons. Tucker felt that only 15 per cent of all the patients whom he saw with laryngeal cancer required a total laryngectomy; New performed the operation on 68 per cent, and Orton on 92 per cent.

With these facts in mind, one can see that the radiotherapist has done well to report results from modern fractionated roentgen therapy in the treatment of large intrinsic and extrinsic cancers that are comparable to those obtained by surgery. The advantage of successful roentgen therapy is the preservation and restoration of the voice and other important functions of these structures. The daily treatment requires but a few minutes, and most patients can continue their occupations during the course of the treatment. The roentgen treatment is a clinical process and requires observation of the lesion and consultation with the laryngologist. This cooperation is necessary if the patient is to receive the most efficient treatment.

It is our opinion that in the treatment of early, localized cordal cancer of low-grade malignancy the method of choice is laryngofissure. If the lesion is still intrinsic but has become large and bulky and is of a high-grade malignancy, the final decision between a total laryngectomy and radiation should be made by the two specialists in consultation.

Dr. Israel referred to the superior results obtained by MacKenty in the treatment of cancer of the larynx by total laryngectomy. It should be made clear that these results were made possible by the fact that MacKenty, to use his own words, attributed his success to "accepting for operation only intrinsic cases, to rejecting bad risks, and to following the operative technic that I have described."

SICKLE CELL ANEMIA WITH CEREBRAL THROMBOSIS*

By A. Izard Josey, M.D.
Columbia, South Carolina

Because of the rarity of cerebrovascular lesions in sickle cell anemia this case should be of considerable interest. Diggs[1] stated in 1934 that the cerebrospinal manifestations of this disease had not been sufficiently studied and a search of the literature reveals a total of only five reported cases of cerebrovascular manifestations associated with sickle cell anemia. Arena[2] cites two cases of hemiplegia with blood in spinal fluid and resulting spasticity after recovery. Kampmeier[3] describes the case of a colored boy with sickle cell anemia who had several attacks of convulsive seizures and finally a hemiplegia with bloody spinal fluid. Baird[4] reported a case of vascular accident in an adult negro which he felt was based on sickle cell anemia. A case of subarachnoid hemorrhage without hemiplegia in a 7-year-old colored boy was reported by Cook.[5] Arena[2] states in his report that Sydenstricker and Cooley have had three cases of hemiplegia similar to the one he reported.

In describing the pathology of sickle cell anemia Diggs[1 6 7] stresses the finding of multiple thrombi and infarcts in many organs, but particularly in the spleen, liver, kidney and bone marrow. He apparently feels that recurrent thrombi in these organs account for much of the clinical course and late pathological find-

*Received for publication January 7, 1939.

Fig. 1
The patient, showing undernutrition and muscular atrophy.

ings. The case here reported most probably represents recurrent cerebral thrombosis.

J. G., a colored boy of 8 years, was first seen June 8, 1937. Delivery had been normal at term and he was apparently normal to about 1 year of age. From that time he had been "sickly and weak." He talked before he walked at the age of about 2 years and was accepted as normal mentally. During the third year he recovered from typhoid and pneumonia and was apparently progressing normally until shortly after his fourth birthday. Then began, at intervals of several months, a series of attacks lasting a week or more, in which there was difficulty in talking, swallowing and walking. Between these periods of disability the boy was described as normal by his parents. At the age of 6 years he was sent to school, but shortly thereafter he lost the use of his left arm and leg for a period of about six weeks, with the development of a limp for a longer period. However, in spite of recurrent attacks of joint pain and swelling, he returned to school the next year. In March, 1937, paralysis of the right arm and leg with aphasia occurred. Before he had recovered from this situation, paralysis of the left arm and leg developed about June 1, 1937. The mother had also observed intermittent fever, profuse sweating, difficulty in swallowing and weight loss.

On examination he was markedly undernourished and had a temperature of 101° F. and pulse 120. Apparently understanding what was going on about him, and following the examiner with his eyes, there was no response to stimulation but a stridulous cry. Respirations were increased and somewhat stridulous. The arms were held in flexion at the elbows, legs stiffly in extension and head held backwards. There was very little spontaneous motion but crying and on passive movement there was marked generalized spasticity. No skeletal deformities were present, but the muscles of the extremities were atrophied to a considerable degree. The skin over the legs exhibited many small areas of dark pigmentation. The sclera had a greenish tint. Pupillary reactions were normal and there were no changes observed in the fundi. The tongue lay in the midline and the uvula moved normally. No lymph nodes were felt. The lungs were clear, the heart somewhat enlarged to percussion and there was a loud blowing systolic murmur heard over the pericardium. Blood pressure was 140/80. The liver edge, felt slightly below the costal margin, was smooth and not tender. The spleen was not felt. There was no edema of the extremities. All tendon reflexes were hyperactive and there was a sustained ankle clonus on the right and a partially sustained clonus on the left. The Babinski reaction was positive on the right and equivocal on the left. As far as could be determined sensation to pin point was normal. The urine contained a one plus albumin, urobilin, a few hyalin and granular casts and a rare fatty cast. Hemoglobin was 45 per cent (Sahli); red blood cells were 2,330,000 and white cells 21,000. The differential count showed neutrophils 84 per cent, basophils 1 per cent, lymphocytes 12 per cent, and monocytes 3 per cent. Platelets were present in the usual numbers. The stained blood smear showed considerable distortion of the red blood cells, but little variation in the depth of staining of these cells. A few sausage-shaped cells were seen. The reticulocyte count was 24 per cent. A wet preparation of blood showed a number of sickle-shaped red blood cells within a few minutes. After two hours approximately 50 per cent of the cells were sickled and at the end of 18 hours there was practically 100 per cent sickling of the red cells. Daily observations of this preparation were made and, after five days, there was a tendency for the red cells to return to the normal form, and after eight days all had returned to the discoid form.

Blood from the father and mother were tested for sickling. None was found in the father, but at the end of 24 hours a few typical sickled red cells were observed in the blood of the mother.

Fig. 2
Wet preparation of blood after standing 18 hours.

Additional laboratory examinations on the patient were normal. Blood and spinal fluid Wassermann and Kahn tests were negative and the spinal fluid did not contain any increase in cells or globulin. The blood calcium was 10 mg. per cent and phosphorus 5 mg. per cent. X-rays of the clavarium and legs were normal.

The patient remained in the hospital for a week. After the first day the temperature varied from 99 to 100°. There was no change in the general condition. He was discharged to go home and instructed to take iron by mouth and liver extract subcutaneously.

Fifteen weeks later the patient was seen again. His general condition and nutrition were considerably improved. There was much less spasticity of the extremities and speech had partially returned. Respiration was no longer stridulous. Unsustained clonus was present at the ankles, Babinski was equivocal on both sides and the tendon reflexes were hyperactive. Hemoglobin was 50 per cent, the red blood count 2,570,000 and white blood count 15,800. The sickling phenomenon was present as before.

One year later a report from the patient's local physician stated that there had been some slight improvement in his neurological condition, but that the general picture remained the same.

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EXTRAGENITAL GRANULOMA VENEREUM*

REPORT OF CASE

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A knowledge of the specific histology of granuloma venereum and the ease of demonstrating Donovan bodies in tissue sections affords a means of recognizing lesions which have hitherto probably passed undiagnosed.[1] This has been the experience of a group of workers at the University of Georgia School of Medicine, and in the past two years they have established granuloma venereum of the cervix uteri as an entity,[2] recorded involvement of the uterus, tubes and ovaries,[3] and the report of this case represents the third extragenital lesion[4] that has been observed in their series. From a statistical report on venereal granuloma of the cervix uteri[5] we have concluded that this disease is increasing. The recent impetus in the control of venereal diseases, particularly syphilis and gonorrhea, should also be directed to venereal granuloma. It likewise is probably a venereal disease[6] and of a disabling and disfiguring nature. Since antimony acts as a specific it is essential that a diagnosis be made especially when, as often happens, this affliction is a complication of other venereal diseases.[7] While this affection occurs predominantly in negroes, we have observed it occasionally in white persons.

Last year Greenblatt, Torpin and Pund[4b] reviewed the reported instances of extragenital granuloma venereum and found that the lesions were distributed as follows: thigh, hand, shoulder, neck, cheek, nose, lip, mouth, pharynx and larynx. Hall[8] has recently reported an additional case. The present case is of interest not only because of the location of the lesion, but because of the secondary cellulitis of the neck.

CASE REPORT

In May, 1935, a negro man, aged 41, was admitted to the University Hospital with the following history: seven months previously a small pimple was noticed in the left inguinal region which soon developed into an ulcer. This was disregarded by the patient and only after its size had considerably increased did he visit a physician. He was referred to the out-patient department of the University Hospital, where he was treated for syphilis because the Wassermann reaction of the blood was positive. However, antisyphilitic treatment had no effect on the lesion and he entered the hospital.

Physical examination revealed raw granulating ulcerations in both inguinal regions and a smaller granulating area on the shaft of the penis. The Wassermann reaction of the blood was 2 plus and the Kahn test 4 plus. A biopsy of one of the inguinal ulcers revealed suppurative inflammation; dense plasma cell infiltration, ulceration and granulation. Subsequently Donovan bodies were found in the sections. Treatment with antimony was begun and the patient was referred to the out-patient department for further therapy. He failed to attend the clinic and was not seen again until October 24, 1938, when he reported to the cancer clinic.

At this time he suffered from a massive overgrowth of the gum which followed extraction of several teeth. He also noted a swelling at the angle of the jaw which had progressively increased in size. An exuberant soft red mass, which presented many pinpoint yellowish

*Received for publication April 25, 1939.

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areas, was observed on the right upper gum at the site of the extracted molars. This extended a short distance on to the soft palate. A smaller but similar mass was seen on the opposing gum surface (*Fig. 1*). There was a firm, ill-defined, non-fluctuant, tender tumor mass at the angle of the right jaw, which extended to the neck (*Fig. 2*). No nodules were palpable in this mass. He was admitted to the hospital for further study. Bilateral inguinal ulcerations were still present. Both the Frei and the chancroidal vaccine[9] tests were positive and the Kahn reaction was 2 plus. Histologic study of a biopsy from the oral lesion revealed the characteristic picture of granuloma venereum. Many Donovan bodies were seen in sections (*Fig. 3*).

Inasmuch as the patient was Frei positive, material was aspirated from the tumor-like mass of the neck and an antigen prepared according to Frei's technic.[10] Stained films of aspirated exudate revealed Donovan bodies in apparently pure culture. However, after culturing, the exudate was found to contain staphylococci. The freshly prepared antigen was given to the patient and to two other proven cases of lymphogranuloma venereum. A known Frei antigen was used as a control. After 48 hours all three patients reacted strongly to the known Frei antigen, whereas the antigen prepared from the aspirated exudate produced no specific reaction. The diagnosis was then evident, granuloma venereum of inguinal regions, mouth and neck. The possibility of venereal lymphogranuloma of the neck had been eliminated.

Fig. 1
Note the mass of exuberant granulation tissue on the upper gum.

Fig. 2
Note the swelling at the angle of the jaw.

DISCUSSION

A peculiarity of the case is the cellulitis of the neck. This was definitely an extension of the process from the gum, because Donovan bodies were demonstrated in the aspirated material. At first, because the patient reacted to Frei antigen, it was thought that he also suffered from an active lesion of venereal lymphogranuloma which involved the nodes of the neck. Mixed infections of the venereal diseases are commonly encountered, especially in association with venereal granuloma.[7] A positive Frei test, however, does not always indicate that the existing lesion is venereal lymphogranuloma. It only reveals that the virus has previously been introduced into the body. To eliminate lymphogranuloma venereum it was necessary to perform a cross Frei test; that is, use aspirated material from the neck as an antigen and try this on known positive reactors. This antigen failed to give reactions in proven cases of lymphogranu-

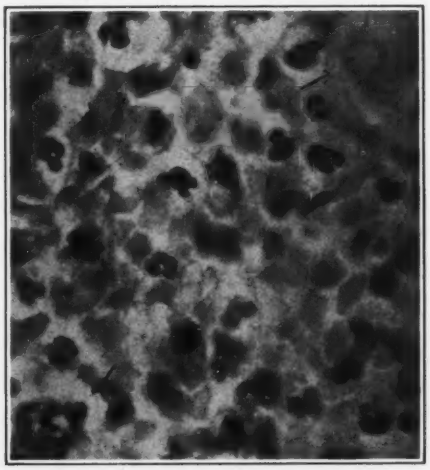

Fig. 3
Two pathognomonic cells are seen in this field. One is unilocular and the other multilocular. Note the peripheral distribution of the Donovan bodies in the cysts. (Hematoxylin and eosin X 2,000.)

loma venereum. This patient also had a positive chancroidal vaccine test and positive Wassermann reaction. Like the Frei test, these reactions do not necessarily imply that the active lesion is due to one of these infections. When pudendal ulcerations are present in any patient, venereal granuloma must be considered as a possibility. The presence or absence of positive Frei, chancroidal or serologic tests for syphilis, are not sufficient to establish a diagnosis. Sometimes the Donovan bodies are difficult to find in films. In these instances, recourse to biopsy is essential and then not only may Donovan bodies be demonstrated when present, but frequently other complications, such as chancroid, lymphogranuloma venereum and fusospirochetosis, may be recognized.[7]

The manner of spread to the neck brings up interesting speculation. The site at the angle of the jaw suggests lymphogenous extension. However, in the usual patient with venereal granuloma the lymph nodes exhibit little reaction. Regional lymph nodes do, however, harbor Donovan bodies, as we have observed in a recent necropsy. In that particular case, the lymph nodes were normal in size and there was no histologic inflammatory reaction. The sinuses contained many pathognomonic cells, the large mononuclear cell containing the encysted Donovan bodies. Is it possible that the lymph nodes themselves are resistant to the Donovan bodies but liberate them into the surrounding tissues? Is this the probable explanation for the prevalence of the active lesion in the inguinal region and hence the name granuloma inguinale? This has been our opinion and we have spoken of the early inguinal lesion secondary to genital involvement as pseudo-bubo.[11] This point we hope to prove in a subsequent article.

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THE CONGENITAL FACTOR IN ACQUIRED DIVERTICULOSIS OF THE JEJUNUM AND ILEUM*

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Diverticula of the lower small intestine are of intriguing interest. From differences in origin and development they have been divided into two groups. In the first are lesions that are described as being congenital, primary or true; in the second are acquired, secondary or false diverticula.

A congenital diverticulum occurs in one of every two hundred persons and is present at birth. It is a true pouching out of the intestinal wall and contains all the tissue layers of the intestine. It springs from the anti-mesenteric portion of the intestine and is single. Nearly always it is the remains, first described by Meckel, of the partially obliterated vitelline duct. Areas of heterotopic gastric mucosa, in such a structure which tend to ulcerate, to bleed and to perforate, conclusively prove its congenital origin. Having the same power of contractibility as the intestine a Meckel's, when its lumen is not obstructed, does not tend to progressive enlargement and grows only as the intestine itself grows.

Acquired diverticula, on the other hand, differ markedly from this, only one hundred cases having been found in the literature by Guthrie[1 2] in 1937. As a rule, they do not appear until middle or old age and they are invariably multiple. Arising from both sides of the intestine, near the mesenteric attachment, they begin as small outward sacculations of the intestinal wall

*Received for publication March 7, 1939.

through weak places in the muscle coats that occur about the entrance of blood vessels. At first all tissue layers of the intestine are continued into the wall, but as the diverticulum is progressively distended from intra-intestinal pressure its wall becomes thin so that it may be no thicker than tissue paper, and consist of the mucous and the serous coats only. From continued stretching the muscle fibers become attenuated and finally disappear except at the base of the enlarging globe-shaped diverticulum. In this way a vicious circle is established, the decreasing resistance to distention causes increasing intestinal stasis, which in turn results in greater distention of the diverticulum.

As a rule the lumen of a Meckel's varies but little in size from base to tip, being at the base about the size of the lumen of the intestine itself. Often in size and shape it is not unlike the human thumb. Differing from this, an acquired diverticulum is balloon-shaped with a greatly enlarged lumen beyond the somewhat constricted base.

Drummond is quoted by Rankin[3] as having suggested a congenital factor in the development of acquired diverticula. The recognized etiological factors in them are weak places in the intestinal wall about the entrance of blood vessels, as described by Edwards,[4] plus intra-intestinal tension or pressure sufficient to cause the mucosa to push out through these places of lessened resistance. Straining from constipation or partial obstruction may be a contributing cause. Apparently the condition is a true herniation of the intestinal wall that is dependent upon local congenital defective muscular development similar to local defective muscular development of the abdominal wall which is universally recognized as being the predisposing cause of abdominal hernia. Although there is no preformed sac in a diverticulum, it develops along the blood vessels as does hernia along the inguinal canal or through the femoral ring. The formation of epigastric hernia along the artery as it passes through the fascia is even more strikingly similar to the development of acquired diverticula. Probably neither ever occurs in an individual of normal muscular development and neither may become manifest until middle age, when muscle tone is beginning to be lost.

CASE REPORT

Mrs. M. L., a white woman, aged 56, was admitted to the Columbia Hospital January 6, 1938, complaining of abdominal pain and nausea. Although of normal stature and well nourished, she had never enjoyed good health, being even as a child subject to spells of indigestion and flatulence. In adult life she had had spells of mental depression, one of which culminated in an attempt at suicide. After this she was admitted for a stay of several months to the State Hospital for the Insane. In 1921 I removed, for persistent bleeding, the uterus with multiple fibroids and the appendix, at which time she had bilateral inguinal hernia which had recurred soon after operative repair by another surgeon. In 1934, I repaired a large umbilical hernia with strangulation of the small intestine. This had not been present at the laparotomy done in 1921. Neither in 1921 nor in 1934 were any diverticula found. On January 8, 1938, I was asked to operate upon her for the relief of intestinal obstruction. At the time she was greatly distended and her bowels had not moved since admission twenty-eight hours previously. At operation there was no recurrence of the umbilical hernia. The small intestine was everywhere grossly distended as if about to burst. A loop was fixed by adhesions and apparently obstructed in each of the large recurrent inguinal hernia sacs. Eight or ten feet of the intestine, involving much of both the jejunum and the ileum, presented a striking pathologic picture. Along each side of the intestine at the mesenteric attachment were greatly distended thin walled cystic masses which proved to be diverticula. They varied from a pea to an orange in size and in places were so closely placed that they seemed to be in clusters. Some had apparently coalesced into a single large mass. The sigmoid colon was found collapsed and the ascending colon distended, the cause being that much of the transverse colon and most of the stomach were found to be incarcerated in a large congenital hernia of the left diaphragm which had not been suspected at previous operations. Because of the futility of attempting radical surgery for the relief of

Fig. 1
Photograph of intestine showing coalescing diverticula.

such serious multiple lesions the abdomen was closed after the mechanical obstruction at the three hernial sites had been relieved. The patient died next day.

Autopsy by Dr. Plowden showed enormous distention of the entire small intestine which was notable because of many huge bleb-like dilatations of the gut wall in close proximity to the mesenteric attachment. Some of these extended backward into the mesentery, but most of them were lateral to and evenly distributed on either side of the mesenteric attachment. They varied in size from one-fourth inch to two and one-half inches in diameter, were of tissue paper thinness and were highly translucent, suggesting that there had been a break in the musculature of the intestinal wall with a pushing of the mucosa outward through the vent.

Microscopic examination of sections taken from the dome of a large diverticulum showed some attenuated muscle fibers still present, indicating that the lesion was of comparatively recent development.

A case with multiple abdominal hernia associated with extensive acquired diverticulosis of the jejunum and ileum is briefly reported. Each condition has seemingly been dependent upon congenitally defective musculature as a cause. The case is somewhat unique in that multiple gross lesions have resulted from developmental defects in both the striated and the non-striated muscle in the same individual.

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DIVERTICULA OF THE ALIMENTARY TRACT*

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Diverticula occasionally occur in any part of the alimentary tract. Until 1912, when x-ray made it possible to identify them, they were largely reported at autopsy findings, although they were occasionally found and reported at operation. For many years their origin and development have been discussed. Most of the controversy concerned the question as to whether they were congenital or acquired. Through the stimulus of this discussion the issue has been clarified until now we know that while certain of them may be congenital, most of them are acquired as a result of congenital weakness of the wall of the tube and develop as a result of the pressure from within causing a bulging through a weakened area in the wall. Not all are acquired in this way, however; some are acquired by scar tissue developing in an adjacent area which results from inflammation outside of the gastro-intestinal tract.

This recognition led to the present classification of first pulsion diverticula and second traction diverticula.

In pulsion diverticula, which are by far the most common, the physical factors leading to their development may be actual weakness of the musculature, a lack of coordination of the muscles, an unevenness of the propulsive force on the wall, or a weakness due to perforation of blood vessels. In a given case all these factors may enter into the beginning and development of a diverticulum.

In the traction diverticula these factors are not the cause. In this type of diverticulum the whole wall is forcibly pulled out by the scar contraction.

While a diverticulum may be a distinct entity of some part of the gastro-intestinal tract, it has been found by x-ray studies and autopsy that some individuals have a tendency to diverticular formation and diverticula are found simultaneously in several parts of the alimentary tract.

In frequency, Fraser states that diverticula of the gastro-intestinal tract occur in the following order: colon, rectum, duodenum, pharynx and esophagus, stomach and jejuno-ileum.

We will discuss this subject, not in the order of frequency, but from the esophagus downward.

DIVERTICULA OF THE ESOPHAGUS

In the esophagus the most interesting diverticula are the pulsion type, sometimes called pharyngo-esophageal or pharyngeal diverticula. The first mention of an esophageal diverticulum which appears in the literature was made by Ludlow in 1746, when he described what we now term a pulsion diverticulum of the esophagus. Rokitansky, in 1840, divided esophageal diverticula into the pulsion and traction types.

The pulsion type is not a true diverticulum, but rather a herniation of the mucous and submucous coats of the esophagus through the muscular coats. Killian and Keith have demon-

*Read in General Clinical Session, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

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strated that they originate between two definite parts of the inferior constrictor muscle, that is, between the transverse lower constrictor fibers and the circular or oblique fibers of the constrictor inferior pharyngis muscles that go to make up the cricopharyngeus muscle. While this statement is usually accepted, evidence has recently been produced showing that this may be incomplete.

The traction type of diverticula are true diverticula in that the sac contains all of the coats of the esophagus. They occur almost always in the thoracic portion of the esophagus, and result from cicatricial contraction of the inflamed lymph nodes, which by true traction pulls the walls of the esophagus outward, causing a diverticulum to develop. They usually are small, transverse in relation to the esophagus, and cause but little trouble, as the neck of the sac is rarely narrow, and because the walls contain the muscular coats of the esophagus they tend to empty readily. Because of their situation operation is not advisable.

Two other types have been described, a congenital type which is related to branchial fistula, and a lateral diverticulum described by Moynihan which arises from a gap below the borders of the cricopharyngeus and the fibers of the esophagus. These two types are very rare.

The pulsion type of diverticulum is entirely different from the others. It is sometimes called, because of its origin, a pharyngo-esophageal diverticulum. Its site of origin is at almost a fixed point. Its progress is constant and its anatomy and relation to surrounding structures varies but little. It probably occurs more frequently than we realize; two hundred and seventy-six cases were reported at Mayo Clinic prior to 1933; thirty-five have been reported by Lahey. and seventy-nine reported by Shallow from the Jackson Clinic. We have observed twelve cases during the past five years. It is more frequent in men than women, about five to one. It is observed usually between 50 and 70 years of age, but may be found earlier in life. The youngest case in our series was 65 and the oldest 78 years.

There have been several theories advanced as to just why these diverticula tend to develop. A history of trauma, goiter and malignancy, or stricture of the esophagus, is sometimes present. The most frequent explanation is that in the act of swallowing considerable pressure is exerted on the wall of the esophagus, and that as a result of this a bulging of a weakened area might be started. Negative pressure created in the act of swallowing has also been suggested as a cause. Jackson feels that it may be due to an incoordination of the muscles in the act of swallowing. C. H. Mayo suggests that an embryologic or developmental anomaly may be the basis on which pulsion diverticula develop. Judd has noted that there is frequently a dimpling in the mucosa at the point where these diverticula arise, and this may be a potential factor in their origin. Shallow thinks that penetration of the nerves or blood vessels through the wall of the esophagus may represent a weakened area and contribute to the cause. Since no constant factor has been found explaining the etiology, this point must remain at present somewhat speculative. Once, however, a bulging of the wall or a small sac is evident, the explanation of why it progresses is seen. Physical factors tend to increase its size; its course downward is explained on the same basis influenced by the anatomy of the area. Fascial planes lead downward from the cervical region into the mediastinum; this is due to the fact that during embryological development the mediastinal structures originate in the neck and migrate into the chest, carrying their enveloping fascia with them. There are no transverse demarcations to segregate these planes, a factor of importance when considering their surgical problems. The sac of a pulsion diverticulum tends to pass downward between the fascial planes which envelop the esophagus; behind we have the prevertebral fascia; in front the pretracheal fascia. Because of the relation of the esophagus to the cervical vertebra the sac tends to go to the left.

Since esophageal pulsion diverticulum is a diverticulum of gradual development, the clinical symptoms present in a given case will depend on the stage of development of the sac. Lahey has divided esophageal diverticula into three stages.

First. "At the stage when the sac is a mere bulging in the wall, the symptoms are only those which would be associated with small particles of food being stuck in the sac. They are a sort of foreign body in the throat, and attempts to expel them by coughing and expectoration are made. One does not see at this stage the return of any considerable amount of a previous meal, nor is there any getting up of the glairy mucus which appears in the later stages."

Second. "The symptoms associated with the intermediate type of esophageal diverticulum are largely related to the accumulation of food in the sac. The sac is sufficiently large so that food passes into it and remains there, and is regurgitated from it, but is not

sufficiently large to produce obstructive symptoms. The particular symptoms therefore are related to the regurgitation of food taken at a previous meal, often mixed with glairy mucus. There are often, at this stage, noises due to the mixture of air with contents of the sac. In addition to this, the patients are frequently able to expel the contents of such sac by pressure over the sac and by assuming certain postures."

Third. "The symptoms that are associated with the terminal stage of esophageal diverticulum are largely those of the second stage in an exaggerated degree plus those of obstruction. When the sac has reached large proportions the opening into the diverticulum is no longer on the lateral wall of the esophagus, but tends to be more or less transverse, and the opening in the true esophagus tends to be more lateral. This results in all the food swallowed passing first directly into the sac. This dilates the sac, drags the sac further down into the mediastinum, and also further narrows the lateral opening into the esophagus. This produces more and more definitely obstructive symptoms until finally complete obstruction can occur, due to the narrowing of the true opening into the esophagus by traction, plus the actual pressure of the dilated mediastinal sac on the esophagus. This can result in a quite serious situation due to diminished fluid intake with emaciation and finally real danger of starvation."

The diagnosis can usually be made from the clinical history. This may be confirmed by x-ray, the passage of sounds and esophagoscopy. In differentiation, carcinoma of the esophagus, stricture with dilatation of the esophagus, and cardiospasm must be considered.

When diagnosis has been made operation should be advised, except in the very early cases, where dilatation may keep the patient quite comfortable for a time. Severely dehydrated cases should be properly prepared by the administration of fluids. Starvation should be temporarily relieved by administration of food, either by a tube successfully passed into the stomach by the esophagus, by a tube through the sac in the first stage of the operation, or by a gastrostomy. While temporizing measures may be used for a time, permanent relief can be accomplished only by operation. Most cases are suited to operation at once inasmuch as with the present operation the patient is able to take food immediately.

While there has been some discussion as to the one- or two-stage operation, most authorities feel that a two-stage operation should be used. This obviates, to a large degree, the danger of a fatal mediastinitis, which condition presents the most serious danger incident to the operation. Other dangers incident to the procedure are largely those associated with the advanced age and general poor surgical risk of the patient.

During the past five years we have seen twelve of these cases. Two refused operation; one of these, a very small diverticulum, was not operated upon; one is under consideration now and will be operated upon at an early date. Eight have been operated upon and relieved entirely of the distressing condition.

DIVERTICULA OF THE STOMACH

Diverticula of the stomach are very rare. When found they are usually found near the cardiac or in the prepyloric region. They have been divided into three types.

First, true, or congenital diverticula.

Second, acquired diverticula, which may be of the pulsion, or traction type.

Third, false diverticula in which there is evidence of a break in the gastric wall incident to disease. Their diagnosis is extremely difficult, even by x-ray, and most of these cases have been found at operation on the stomach without having been previously suspected. There are no characteristic symptoms, and usually they are symptomless. Cases have been operated upon, however, where symptoms occur due to retention of gastric contents in these pockets. Hemorrhage has been reported from some of them. Surgery is indicated where symptoms are present, and the location of the diverticulum makes surgical procedure permissible. Medical management is indicated in the presence of mild symptoms.

DIVERTICULA OF THE DUODENUM

Duodenal diverticula have been reported for a long time as findings at postmortem. The perfection of the roentgenological examination has made their finding and recognition quite frequent. Their incidence, in the opinion of various authors, is from 0.9 to 2 per cent of cases in routine x-ray studies of the stomach and duodenum. Their location, according to a report of 141 cases from Mayo Clinic, is 26 per cent in the first part, 58 per cent in the second part, and 16 per cent in the distal part of the duodenum. Case, in 1913, reported the first to be diagnosed by x-ray and verified at operation. Duodenal diverticula are considered to be congenital or acquired in origin. While it is generally believed that congenital weakness is the cause of all diverticula, there is evidence that faulty embryologic development may be a cause. Misplaced pancreatic tissue is found associated with diverticula. Here again diverticula may be of the traction type, due to adjacent inflammatory areas. True diverticula may be associated with duodenal ulcer, but not in the ulcer area, but

rather as a result of physical changes in the duodenal wall from scar tissue contraction, causing pouching. True diverticula of the duodenum are found most often in the concave or pancreatic side of the duodenum. They may contain all of the normal wall, or the muscular layer may be lacking. Depending on their location, the peritoneal coat may or may not be present.

Most authors believe that there are no characteristic symptoms of duodenal diverticula, and that most of them give rise to no symptoms. Others believe that symptoms attributed to them are due to complicating conditions. Undoubtedly there are some of the diverticula which give rise to definite trouble: nausea, vomiting and diarrhea have been attributed to their presence. Hemorrhage has been known to occur. Lockwood believes that definite symptomatology is associated with them.

Diagnosis is made by x-ray examination, and usually they are found when the examination is made for some other condition. Surgical treatment is not indicated in many of these cases. Surgery directed at complicating conditions usually relieves the symptoms attributed to them. They are usually considered cases where medical management is indicated. In only the large diverticula, or in those giving persistent symptoms definitely attributed to their presence, should surgery be done, and only then if it can be done without grave risk which may be encountered because of their location.

DIVERTICULA OF THE JEJUNUM AND ILEUM

In the jejunum and ileum, except for Meckel's diverticulum, diverticula are very rare, and are not clinically demonstrable. They are occasionally found at operation or postmortem. Even when they are found operation is rarely done for this condition. A few cases have been reported of extensive resection. Larson recently reported a successful case where fifty-five inches of the small bowel was resected because of multiple diverticula which were giving serious trouble due to retention of bowel contents and inflammation.

MECKEL'S DIVERTICULUM

Meckel's diverticulum is a relatively infrequent condition, but because of the occasional complications which result when it is present, considerable interest has been evident and many articles have been written concerning this condition. Probably the first mention ever made of what we now term Meckel's diverticulum is credited to Lavater in 1672. Meckel first described the condition as we know it today, and was the first to explain its development, and its origin from the yolk stalk. The incidence of Meckel's diverticulum is between 1 and 2 per cent. Its position will vary, dependent upon the age of the individual, from a few inches from the ileocecal valve to three feet. It varies in size, occupies a position on the ileum opposite to the mesentery, and derives its blood supply from the mesenteric vessels, at times supplemented by persistent omphalomesenteric vessels. Early writings on Meckel's diverticulum were chiefly concerned with the complications of obstruction resulting from persistent bands, or from adhesions of the diverticulum to adjacent intestines.

Womack and Siegert, in a recent article, group diverticula of Meckel's diverticulum into four clinical types and describe the resulting symptoms of each type.

First, catarrhal inflammation with or without associated regional complications.

Second, intestinal obstruction.

Third, gangrene of Meckel's diverticulum.

Fourth, peptic ulcer due to the presence of ectopic gastric tissue.

The clinical diagnosis of Meckel's diverticulum as responsible for any of these types of trouble is almost impossible except as an operative finding.

Meckel's diverticulum should be removed surgically when any pathologic condition is found at operation or when it is recognized as a potential source of trouble.

The most interesting discussion revolving about this subject is that related to the presence of ectopic, gastric or duodenal tissue in the wall of the diverticulum, with the resulting ulcer formation, hemorrhage and possible perforation.

DIVERTICULA OF THE COLON AND SIGMOID

Diverticulosis of the large bowel is an extremely common condition. The incidence is probably in the neighborhood of 5 per cent in all cases. It occurs much more frequently in

middle age and old age than in the young. Diverticula here may be single or multiple. Their occurrence varies from one diverticulum to many, or even studding of the entire left colon. They vary in size from minute pockets to from one to four cubic centimeters in diameter. Diverticula of the large bowel occur most commonly in the sigmoid and decrease in frequency in the colon from the left to right. Their etiology undoubtedly depends on many factors. Anatomical weakness of the wall of the bowel, plus normal and disturbed physiology of the bowel function, are no doubt the most important causes.

Diverticula of the colon are as a rule symptomless. It is only when, because of their location, shape and size, they become obstructed and inflamed that they cause trouble. When this occurs diverticulosis becomes converted into diverticulitis. Like diverticula in other parts of the gastro-intestinal tract, if stasis and inflammatory changes ensue, the musculature becomes thinned, rupture may occur, and localized abscesses, or a condition of peridiverticulitis may develop. Rarely will peritonitis ensue; as a rule the area is protected by adhesions from the general peritoneal cavity. Inflammatory reaction outside of the bowel may produce obstruction or fistulas may form, penetrating other viscera.

The symptoms of diverticulitis are commonly: pain in the left lower quadrant of the abdomen, with localized tenderness and rigidity of muscles, nausea and vomiting, and a rise in temperature with increased leukocyte count. Usually there is constipation, although diarrhea may be present. A tumefaction often can be felt. Symptoms of bladder irritability and frequency are often seen.

In the diagnosis of diverticulitis, rectal, or sigmoidoscope examination are of little value. Roentgenologic examination carefully done by one experienced in this work is a great help, and usually accurately locates the trouble. This, with a careful evaluation of the history and symptoms usually enables one to differentiate the condition from carcinoma. While there is no reason to believe that carcinoma and diverticulum may not coexist in the same patient, they usually do not. The occurrence is so infrequent that rarely should one have any great difficulty in making a differentiation.

Diverticula of the colon in themselves need no treatment. It is only when they become obstructed and inflamed that symptoms are produced. When symptoms are present treatment is indicated.

Uncomplicated diverticulitis should be managed medically. With complications surgery may become imperative. The ideal procedure under these circumstances would be resection. This, however, may prove very difficult, and too hazardous. Palliative surgery often is preferable. Colostomy, drainage of pockets or abscesses and dissection of fistulous tracts are often all that can be done in the presence of the inflammatory changes.

Rankin states that the complications which may arise requiring surgery are: first, acute perforation; second, abscess; third, fistulous tracts; fourth, inflammatory obstruction; and fifth, malignancy. Conservative surgery should be done in many of these cases. Radical surgery, because of the accompanying infection, will be attended by a high mortality.

CONCLUSIONS

(1) A brief consideration is submitted of diverticula of the gastro-intestinal tract.

(2) The symptoms of diverticula of the gastro-intestinal tract, in whatever part they are found, come from the same cause: retention, pressure and inflammation.

(3) Most diverticula of the gastro-intestinal tract are symptomless and require no treatment.

(4) Medical management is often advisable and effective in relieving symptoms of diverticula of the gastro-intestinal tract.

(5) Surgery may be necessary in certain of the complicated cases.

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HEAD INJURIES*

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No physician can escape the treatment of head injuries. His particular interest may lie in some other phase of medicine, but sooner or later he will be stopped at the roadside and asked to administer first aid to a person who has sustained a severe craniocerebral injury. The frequency of these injuries is appalling. Swift states that the approximate number of fractures of the skull which occur annually in the United States is around 112,000. Thus it becomes the duty of every physician to familiarize himself at least with the emergency management of head injuries. No hospital is so small that it does not need to be prepared to receive these seriously injured patients. In the event that the attending physician does not feel qualified to diagnose the extent of the injuries or carry out the treatment indicated, competent consultation should be secured immediately. Reviews of statistics by Munro and Mock and co-workers[6 7 8] show that the mortality varies from 40 per cent to 15.6 per cent. Though the variations in mortality may be influenced by the number of patients with severe or slight injuries included in the respective series, it is apparent that the mortality is distinctly lowered when the patient is given prompt attention.

In reviewing the literature on craniocerebral injuries, one gains the impression that there is considerable confusion about the accepted methods of treatment. However, on careful analysis of the different reports one learns that all writers on cranial injuries agree that the injured patient should be promptly treated for shock and intracranial hemorrhages and that débridement should be employed for scalp, skull and cerebral injuries. The group is divided concerning the indications for spinal drainage, which suggests that the extreme views of those that advocate never doing, or always doing a spinal puncture following a craniocerebral injury should be modified. There are times when one would like to know whether blood was present in the spinal fluid, and occasionally spinal drainage supplements dehydration in controlling cerebral edema.

The management of increased intracranial pressure resulting from a cerebral injury is not always easy to outline, since hemorrhage as well as edema may produce the increased pressure. Extradural, subdural and intracerebral hemorrhages require surgical treatment. Cerebral edema can be controlled by nonoperative measures as well as by a cranial decompression. Hence, we find that two schools of thought exist. The one advocates operative measures,[4] the other nonoperative treatment.[5] Those who believe in the operative treatment for increased intracranial pressure argue that intracranial hemorrhages will often be overlooked unless craniotomy is performed. Those who advocate the nonoperative treatment argue that unless the hemorrhage is massive, surgical intervention may be avoided.

The nonoperative treatment consists of three procedures. The first is that of active dehydration accomplished by saline cathartics, intravenous administration of hypertonic solutions and limitation of fluids. The second consists of diagnostic spinal punctures and repeated spinal drainages. The third is frequently referred to as the "do nothing" treatment, since neither dehydration, spinal drainage nor temporal decompression is employed. Those advocating this treatment carry out the usual careful management of traumatic shock, employ surgical procedures for the control of hemorrhages, elevation of fragments and thorough débridement of compound comminuted fractures and administer barbiturates to quiet the patient, but give no fluids until the second or third day, thus allowing the patient to dehydrate himself.

There are distinct merits and limitations in all the individual procedures. Undoubtedly an occasional cerebral herniation may follow excessive spinal drainage.[10] Dehydration may be carried to excess, especially if the patient is in deep coma and is unable to take fluids by mouth. The "do nothing" treatment may result in death if there is a high degree of increased intracranial pressure. The temporal or suboccipital decompression may also fail to give sufficient relief to control the increased intracranial pressure. I[1] have observed, even though my experience is not so extensive as that of Munro, Mock,[6 7 8] Fay, Dandy, Coleman, Rand,[9] and others[3] who have emergency services in large city hospitals, that a combination of two or more of these various procedures often proves more effective in treating increased intracranial pressure than rigid adherence to one type of treat-

*Read in Section on Railway Surgery, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

*From the Section on Neurologic Surgery, The Mayo Clinic.

ment. It is extremely important to recognize the extent of the injury in order to select the most suitable treatment.

In outlining treatment for head injuries I find it convenient to discuss three phases: emergency treatment, convalescent treatment, and treatment of posttraumatic sequelae.

EMERGENCY TREATMENT

The emergency treatment consists of transferring the injured individual to the hospital, recognizing the extent of the injury, treating traumatic and cerebral shock, controlling hemorrhages, operative procedures on compound fractures, and the management of increased intracranial pressure when present.

When called to attend a patient who has met with an accident, one should always be on the alert to evaluate the whole situation, the nature of the accident, the force of the impact, the position of the patient at the time of the accident, and following the accident, since internal injuries, fractures of the spine or fracture of bones other than the skull may be more serious than the head injury. It is not always easy to determine the extent of the head injury at the place of the accident, but one should observe the mental status, whether or not the patient has been temporarily unconscious, is confused or is stuporous and in deep coma. It is needless to emphasize the fact that obvious hemorrhages need to be controlled and the patient should be transferred without increasing the trauma already produced by fractured bones. Occasionally, the cerebral trauma appears to be slight and the patient has regained consciousness and sees no reason for being hospitalized. If the attending physician permits the patient to return to his home rather than to a hospital, the relatives or friends should be instructed concerning the dangers of hemorrhages and the symptoms that may develop. In most instances the rational advice is to urge the patient, even though the injury may appear slight, to be hospitalized for forty-eight hours.

Concussion.—Concussion is the simplest form of craniocerebral injury. It is a common term applied to head injuries and frequently employed by the laity. It should be restricted to those cases in which a blow on the head has produced some degree of unconsciousness, but in which the patient on recovery presents no residual symptoms. The exact pathologic basis of this phenomenon is unknown; concussion is believed by some to be due to a molecular disintegration resulting from anatomic changes and circulatory damage. Others hold that there is a disturbance in the ions and electrons. Changes in pressure on subcortical vessels from fluid waves as the result of the impact may also be an explanation for the temporary unconsciousness. According to Munro, a violent histologic insult to the brain must be predicated to produce such changes.

Shock.[7]—"General shock is shown by marked pallor; cold, clammy skin; subnormal temperature; a weak, thready pulse; shallow and often rapid respiration; lowered blood pressure, and frequently syncope. When there has been a brain injury, depending upon the extent of the damage, this picture of general shock is modified by the early signs and symptoms accompanying the cerebral injury. Thus, in skull fractures, one should think of shock in terms of cerebral shock. Instead of a short period of syncope, there may be a long period of unconsciousness. Instead of the pulse being weak and thready, it may be very slow and of rather full volume. Instead of the respirations being shallow and rapid, they may be slowed and even stertorous, and in extreme cases may be of the Cheyne-Stokes type. Instead of the blood pressure's being lowered, the first blood pressure after admission may be extremely high. Frequently we have had patients with (systolic) blood pressure as high as 180 upon admission, with a drop to as low as 80 within a few hours."

The disturbance of consciousness may vary from a short period of semi-consciousness, a dazed or confused state, to one of deep coma. Many of the patients are restless and delirious. The majority regain consciousness within hours to three or four days, while in others the loss of consciousness may continue for several weeks.

"*The pulse rate*[7] likewise varies with the extent of the shock, the amount and location of the brain damage, and especially with the time element after the injury. In the presence of general shock, the pulse is weak, thready and often rapid, but, as previously stated, with the development of cerebral shock it may become slow and of rather full volume. If the medullary centers are involved, or with the development of marked edema or hemorrhage tending to cause medullary compression, the pulse rate again increases and may become very rapid, but usually of full volume. In the majority of cases the pulse remains between 60 and 90 and there is more of a tendency to the slow pulse. With the increased intracranial pressure coming on gradually, the pulse slows, usually below 60 and often as low as 40. In all cases other than those of direct medullary injury, the pulse slows. It is often a warning sign of increasing intracranial pressure and, unless this is relieved, it is frequently followed by medullary compression, with the pulse changing to a rapid rate. . . .

"*The respiration rate*[7] behaves, in the majority of

cases, similarly to the pulse rate. If there is immediate medullary damage, the respirations are usually rapid and soon become of the Cheyne-Stokes variety. If there is a subdural or epidural hemorrhage, the respirations are usually slowed and soon become stertorous. Later in the presence of these hemorrhages, when medullary compression occurs, the respirations may again become very rapid. In the majority of cases the respirations vary from 17 to 20. The counting of the respirations in a head injury case must be checked frequently by the attending surgeon. Time and again we have found the respirations recorded on the chart at 20 and, on counting the respirations ourselves, we have found them as low as 14. The period of slowing pulse and respiration rate usually precedes the rapid pulse and respiration indicative of medullary compression. The picture frequently changes so rapidly that unless an hourly or two-hourly record is kept, this period of slowed pulse and respiration will be missed.

"*The blood pressure*[7] is an extremely difficult sign to interpret. In the presence of marked general shock, the blood pressure will be low. If there has been a marked brain injury, even in the presence of general shock the blood pressure may be high. After the first few hours the systolic blood pressure usually stabilizes around 120 to 140, unless it is a patient who runs an habitually low blood pressure or one who is a subject of hypertension. In our opinion, a jumpy blood pressure is the most important sign obtained from blood pressure readings. . . . . With no other indication than this jumpy blood pressure and extreme restlessness, increasing intracranial pressure was diagnosed and was proven by spinal puncture. In our opinion, the blood pressure must be taken frequently; a jumpy blood pressure is indicative of increasing medullary compression, and this sign will often manifest itself before the slowing of the pulse and respirations.

"*The temperature,* in most cases, varies from 99 to 102 degrees. Temperature above 102 is usually indicative of medullary compression or of infection. In the presence of severe lacerations and marked hemorrhage, especially from basal skull fractures, the temperature often increases rapidly and, in fatal cases, may reach anywhere from 106 to 109 or 110 in adults. This increasing temperature, especially over 103 degrees, is an extremely bad prognostic sign. In children, however, we have seen the temperature go to 105 degrees in more than one case, with recovery."[7]

Treatment of Shock.—Though it may be difficult to distinguish between the symptoms that are due to general shock and those due to cerebral shock, the emergency treatments are very similar. Heat should be applied in the form of warm blankets; skeletal fractures should be temporarily supported; stimulants such as caffeine and ephedrine should be administered. In the event of severe hemorrhages, the foot of the bed may be raised and a transfusion administered. As soon as the blood pressure returns to normal and the body becomes warm, examinations should be conducted.

A general examination to determine the extent of bodily injuries other than that to the head should be conducted in conjunction with a neurologic examination. The neurologic examination may be rather unsatisfactory in a comatose or non-cooperative patient, but it is possible to determine whether or not one or both pupils are dilated or whether a squint is present. It is also possible to determine whether or not a flaccid or a rigid paralysis exists and whether the reflexes are normal, lost or exaggerated, or if localized ecchymosis or hemorrhage from the ear or from the nasal orifices is present. The appearance of cerebrospinal fluid from the ear or nasal passages or from the compound fracture is significant. Roentgenographic examinations of the head in the anteroposterior and lateral views and roentgenographic examinations of suspected fractures of other bones are of inestimable value.

When immediate surgical intervention is indicated, it may become necessary on admission to the hospital to take the patient to the operating room, where reparative procedures can be employed simultaneously with the treatment of shock and other bodily injuries. In the event that the patient is delirious a sedative is necessary, but one should never administer morphine since it is a respiratory depressant. The barbiturates, sodium iso-amylethyl barbituric acid and pentobarbital sodium, are the most effective. If it becomes necessary to anesthetize the patient during the emergency surgical procedures, a general anesthetic may be necessary, for a delirious patient rarely cooperates with the surgeon even though the latter anesthetizes the scalp with a local anesthetic. The anesthetic that has proven of greatest value is sodium ethyl thiobarbiturate administered intravenously.

In cleansing and repairing a scalp, skull and brain wound, care should be taken to shave the hair well beyond the wound, remove all foreign material, trim the traumatized edges, remove spicules of bone, prolapsed brain, and aspirate intracerebral clots. An aqueous solution of an organic mercurial germicide is used for cleansing compound comminuted fractures of the skull with the accompanying lacerations of the scalp and brain. The dura should be closed with interrupted sutures of catgut, and the scalp with interrupted dermal sutures of either silk or silkworm gut. Occasionally it is necessary to approximate the edges of the galea with interrupted sutures of catgut. I prefer not to use silk sutures below the scalp in a traumatic wound for fear that an infection may be present, in which case the silk sutures would have a tendency to continue the infection. Small strips of

rubber tubing may be used for drainage. Hemostasis can be effected by ligatures of catgut, by silver clips or by the electrocoagulation current. In the event that there is a depressed fracture or a comminuted fracture which is not compound, the fragments can be elevated and tied in place with silver wire, forming a mosaic pattern at the site of injury. These fragments are held in place by threading interrupted loops of silver wire through gimlet hole openings made in the fragments and in the skull along the margin of the fracture.

On the completion of the emergency surgical treatment of the head injury and other bodily injuries, the patient is returned to his bed, where the treatment for shock is continued. The administration of antitetanic and antigas serum is indicated when abrasions, cuts or lacerated wounds have been sustained. It should not be given until the patient has recovered from general shock. Oftentimes it is wise to delay the injection of these serums until the day following the injury.

Fractures.—Fractures of the skull may be divided into three groups: linear, depressed and comminuted, all of which may or may not be compound.

The linear fractures most frequently involve the base of the skull and not infrequently extend into the nasal sinuses or across the temporal bone. The hemorrhages accompanying them are not serious unless the tears in the meninges extend across meningeal arteries or the cavernous sinus. Linear fractures across the temporal bone frequently result in tearing of the middle meningeal artery with the development of an extradural hemorrhage. Linear fractures extending across the longitudinal or lateral sinuses may have an accompanying tear in the venous sinuses with the development of both an extradural and a subdural hemorrhage. The basal fractures which result in tearing of the meninges will manifest themselves by localized ecchymosis and the escape of blood-tinged cerebrospinal fluid from the nose or the ear. Accumulations of blood will produce signs of increased intracranial pressure. Injuries to the oculomotor nerves will be evidenced by oculomotor palsies; injuries of the petrous portion of the temporal bone are usually associated with facial paralysis and deafness. The symptoms resulting from extradural hemorrhages are delayed and it is not uncommon for a patient to regain consciousness for several hours following the injury and then to lapse again into a state of coma. Extradural hemorrhages also produce a unilateral dilatation of the pupil and a contralateral spastic hemiplegia. Therefore, a patient should be kept under close observation for the first forty-eight hours whenever a fracture is situated over a meningeal artery or a large sinus. Accumulation of blood in the posterior fossa or trauma to the cerebellum produces nystagmus and cerebellar ataxia and occasionally paralysis of the sixth nerve. Fractures of the floor of the posterior fossa may result in tears of the ninth, tenth, eleventh and twelfth cranial nerves.

Depressed fractures vary in extent and location. Small depressed fractures over the silent regions of the brain may be of no serious consequence and need no surgical treatment just as simple linear fractures need no special treatment. If, however, the depressed fracture tears an important vessel the blood clot will need to be evacuated and the hemorrhage controlled. If a depressed fracture occurs in the frontal bone an elevation is indicated for cosmetic reasons. The elevation of such a fracture may be postponed until the patient has recovered from the immediate effects of his head injury. Depressed fractures over the motor, speech or visual centers should be elevated as soon as the traumatic shock has been treated.

Comminuted fractures may or may not be depressed. Whenever the physical examination or the roentgenographic examination reveals spicules driven into the brain they should be withdrawn and the fragments should be elevated, replaced and held in position by silver wire ties if the wound is not compound. Most depressed fractures are comminuted; occasionally it is possible, after making a single trephine opening, to introduce an elevator under the depression and restore its former contour. In the event that fragments of bone are removed a plastic repair may be performed at some later date. Occasionally if the bony defect be small, no repair is necessary unless the fracture has occurred in the frontal bone, when, for cosmetic reasons, a repair is indicated.

Control of Hemorrhages.—Extradural arterial hemorrhages are controlled through a decompression type of craniotomy or through a small flap craniotomy by the application of a silver clip, by ligation of the vessel with silk or by the electrocoagulating needle. Extradural clots are evacuated and the pockets are cleansed with saline solution. If a marked cerebral depression has resulted, a small tube drain should be left in place for twenty-four hours. Tears in the

large sinuses should be explored at the location of the fracture across the sinus. This is done by trephining over the location and enlarging it sufficiently to expose the tear. Rents in the sinus are repaired by the application of a pledget of muscle which is held in place by a wick of gauze for seventy-two hours. The dura, lateral to the sinus, should be incised in order to determine whether or not the tear in the sinus has resulted in an extravasation of venous blood into the subdural spaces. Such lacerations are also repaired by pledgets of muscle. The subdural hemorrhages are removed by repeated aspirations and saline washings. The dura is closed with either catgut or silk, depending on whether or not the wound is compound.

Occasionally subdural hemorrhages[2] result from tears in small vessels extending from the dura to the arachnoid. These tears result in slow extravasations of blood with the development of symptoms of intracranial pressure or focal signs of compression. These injuries may not have any accompanying skull injury. The suspicion of a subdural hematoma justifies burhole openings and incisions in the dura to clarify the diagnosis. Occasionally a patient will appear to recover from the symptoms of an acute head injury, but fail to regain his normal health. Drowsiness may persist; headaches may continue; focal signs may fail to disappear weeks or even months after a head injury. When this occurs one must consider the possibility of a subdural hematoma. A diagnostic encephalogram may reveal distorted contours in the ventricular system and a failure in the equal distribution of air in the subarachnoid spaces. Since the subdural hemorrhage is free to travel between the dura and the arachnoid on both sides of the brain it is wise to trephine on both sides to avoid overlooking the subdural hematoma on the contralateral side of the injury. Subdural hematomas, unless they have been of long duration, can be aspirated and the pockets washed with saline by the employment of a small catheter which is attached to a syringe. If the hemorrhage has been extensive it may be necessary to make two or three trephine openings and leave a No. 18 catheter as a through-and-through drainage to prevent any subsequent refilling of the cavities. The brain will eventually expand by the refilling of the ventricles and the subarachnoid spaces. This may be hastened by forcing the amount of liquids taken by the patient.

Hemorrhages of the base from tears in the dura are not easy to cope with. If one is in doubt a temporal exploratory decompression is indicated. With an illuminated retractor it is possible to elevate a cerebral lobe and control the meningeal bleeding with an electrocoagulating needle. Hemorrhages from a cerebral vessel can be controlled in a similar manner or with the aid of a silver clip. Usually the hemorrhages are not severe unless a branch of the meningeal artery is torn or the cavernous sinus has been injured. The latter injury, when it occurs, results in such a rapid extravasation of blood that the patient frequently succumbs before surgical treatment can be instituted. If one is fortunate enough to localize the hemorrhage from a vessel of the cavernous sinus it is controlled with a pledget of muscle by a technic similar to that employed when injuries occur to the superior longitudinal and lateral sinuses.

As a rule, it is not wise to attempt a repair of the meninges when an escape of cerebrospinal fluid occurs from the nasal sinuses or the middle ear. One should not perform spinal punctures or spinal drainage for fear of reversing the current and drawing nasal discharges into the meningeal spaces. The judicious use of sulfanilamide serves as a prophylactic measure in minimizing the development of meningitis. The introduction of sterile cotton pledgets into the external ear serves as another protective measure. Usually the cerebrospinal fluid ceases to drip within a week or ten days. Should a cerebrospinal fistula develop, an intracranial repair of the meninges by suture or by the application of a muscle pledget should not be undertaken within less than eight to twelve weeks following the head injury.

Tears in the meninges, especially in the region of the ethmoid and frontal sinus, result not only in cerebrospinal leaks, but occasionally in a pneumoencephalos. These can be visualized by roentgenographic examination. Most of them disappear spontaneously, but occasionally an air cavity may exist for weeks. If it is of any serious size a trephine opening may be employed for the introduction of a brain cannula and the withdrawal of the air in the cavity.

Hygromas may simulate subdural hematomas since a tear in the arachnoid which usually occurs along the sylvian fissure permits cerebrospinal fluid to enter the space between the dura and the arachnoid. These are corrected by performing a small decompression, opening the dura and allowing the fluid to escape. Again a small tube drain is left in place for several days until

the ventricles expand and force the brain against the dura and the cranial wall.

Cerebral Trauma.—Cerebral trauma varies from a localized bruise with punctate hemorrhages to extensive lacerations of the brain. The *contrecoup* injuries may be as great as those at the point of impact. The skull injury is rarely an indication of the extent of the cerebral injury. The degree of coma, the state of the pulse, respirations, blood pressure, and the evidence of neurologic signs furnish the only accurate evaluation of the cerebral injury. Even then it may be difficult to arrive at an accurate opinion, since a rapidly developing cerebral edema or intracranial hemorrhage may exaggerate the symptoms. If symptoms of a localized condition exist, an exploratory decompression may be required to eliminate the possibility of an intracranial hemorrhage. The symptoms resulting from cerebral edema are more or less diffuse; restlessness or coma may persist for hours and days without evidence of localized paralysis.

Intracranial Pressure.—Increased intracranial pressure usually follows a craniocerebral injury.[9 12] It results from cerebral edema and intracranial hemorrhages. With the absence of localizing signs one is justified in performing a spinal puncture. The reading of the spinal pressure indicates the degree of intracranial pressure. Spinal drainage may prove effective in controlling the intracranial pressure. On the other hand, if the spinal pressure is not particularly increased, the pulse is not slowed and the respirations are not stertorous, one need not be greatly alarmed and the so-called "do nothing" treatment may be the advisable course to follow.

However, if signs of increasing intracranial pressure appear the course of dehydration should be followed. It consists of employing limitation of fluids to 1,000 c. c. for the first twenty-four hours, the administration of magnesium sulfate by enema, dissolving 2 ounces of salts in 4 ounces of water, to be followed by intravenous administration of 50 c. c. of 50 per cent solution of glucose or sucrose. Unfortunately the effects of intravenous administration are only transitory and last from four to six hours. A repetition of the intravenous administration may be required during the first forty-eight hours. After the first twenty-four hours, I prefer to administer the glucose in 20 per cent solution in physiologic saline in quantities of 500 c. c. repeated twice or three times daily.

The dehydration measures are supplemented by repeated spinal drainage if the two procedures give evidence of controlling the intracranial pressure, but it should be remembered that if the initial treatment of the cerebral edema by dehydration and spinal drainage is ineffective a large temporal decompression, or even a suboccipital decompression, should be resorted to. Though some surgeons prefer the decompression method for the control of cerebral edema, I prefer to give the dehydration and spinal drainage a therapeutic test before resorting to surgical intervention, and I have also found that the dehydration may even supplement the effects of a decompression.

If the patient has not regained consciousness by the third day, one should be rather cautious about extending the dehydration too far, since the patient automatically dehydrates himself by the loss of fluid through respiration, perspiration and excretion. As a rule, we introduce a Rehfuss tube into the stomach by way of the nasal passages in order to administer 2,000 to 3,000 c. c. of water and nourishment, and saline cathartics if we think it necessary to continue a moderate degree of dehydration. From the third day on until the patient becomes conscious, fluid and nourishment are administered through this tube in small quantities at hourly intervals.

The problem of controlling restlessness is very perplexing at times. I dislike the use of morphine, since it is a respiratory depressant. Codeine is rarely effective; the barbiturates are the most useful. Phenobarbital in rather large doses, grains 1½ (0.1 gm.) every six hours, is usually sufficient. In the more violent cases, sodium iso-amylethyl barbiturate or pentobarbital is required. I dislike to restrain a patient and believe that it is less injurious to the patient to be narcotized by the more potent barbiturates than to be forcibly restrained by wrist and leg bands. In a few instances it has been necessary to administer sodium ethyl thiobarbiturate intravenously as an initial sedative.

CONVALESCENT TREATMENT

On the return of consciousness the physician too often concludes that the patient has recovered from his cerebral injury, but it should be remembered that if the patient is dismissed from hospital care before he has thoroughly recovered he will complain of headache, weakness, dizziness and nervousness, will become discouraged and will develop a series of fear complexes. Therefore, whether the patient remains in the hospital or returns to his home he should be

kept under supervision and directed concerning his activities, his diet and rehabilitative measures. A patient who has sustained a serious craniocerebral injury should not be permitted to return to his regular work for from six to twelve weeks. He should be encouraged to rest and sleep several hours during the day, be allowed to sit up but short periods at a time, take graduated exercises, and eat a well-balanced diet with the proper selection of vitamins and limitation of fluids to 2,000 or 3,000 c. c. per day. Saline cathartics may be required to regulate his bowel habits for the first six weeks, following which he can depend on the proper selection of foods, including fruits, for the reestablishment of his bowel habits. If palsies have developed, physical therapy should be administered. Frequent assurances should be given in order that the patient may regain confidence in himself. In the event that irreparable damage has resulted from the craniocerebral injury, it becomes the duty of the attending surgeon to aid the patient in selecting a change of vocation and insurance adjustment, for if the surgeon is negligent in aiding the patient to rehabilitate himself the latter may become a permanent invalid instead of a useful or partly useful individual.

POSTTRAUMATIC SEQUELAE

Suppurative wounds and cerebral abscesses occasionally follow extensive compound comminuted fractures of the skull with cerebral injury. If a wound should become infected the stitches should be removed to allow for adequate drainage, loose fragments of bone and outjetting necrotic processes of the skull should be removed with a rongeur and the wound should be irrigated with an antiseptic solution. Symptoms of a developing brain abscess may not appear for ten to twenty days following the injury. The most suitable time to drain such abscesses is when encapsulation of the abscess has taken place. This can be recognized by an approach of the septic type of temperature curve to normal and a fall in the leukocyte count. The abscess should be drained at the point of cerebral injury. Adequate and thorough drainage should be instituted in two to three weeks from the onset of the abscess. The drainage tube should be left in place for another two or three weeks, the tube being shortened as the cavity closes and granulates from the bottom.

The most common type of posttraumatic sequela is that of headache, dizziness and fear of being unable to work, losing one's job and not receiving adequate compensation for one's injury. The headache and the dizziness may continue off and on for six months to two years. These two symptoms may result from a low-grade communicating hydrocephalus due to a failure to absorb the cerebrospinal fluid. The failure to absorb the cerebrospinal fluid probably is due to subarachnoid hemorrhage, low-grade leptomeningitis, and a fibrosis of certain stomata in the pacchionian bodies. The final adjustment of secretion and absorption results when an automatic balance between the two takes place. Limitation of fluids to 1,800 c. c. a day and the occasional administration of a saline cathartic appear to give some relief from headache and dizziness. Sedatives occasionally are resorted to, but usually acetylsalicylic acid is sufficient. The economic fears are eliminated by not forcing the patient to return to work before he is able and by making sure that he is capable of fulfilling the tasks assigned to him and that a fair compensation has been made either by the insurance company or by the industrial labor commission.

Cerebrospinal fistulas or skull defects, if they are large or are situated where they are conspicuous, should be repaired before the patient attempts to return to his vocation. The most suitable material to repair skull defects is an osteoperiosteal graft, the outer table from a normal portion of the skull. Perforated celluloid plates wired in place are effective in closing defects when they are situated over the parietal bones. Arteriovenous fistulas between the internal carotid and the cavernous sinus occasionally result from fractures of the middle fossa. The surgical repair consists of an attempt to obliterate the opening of the fistula by extracranial or intracranial ligation of the internal carotid. These operations are not always satisfactory.

Epilepsy.—Epilepsy occurs in about 5 per cent of craniocerebral injuries. It occurs most frequently when the frontotemporoparietal regions have been traumatized. Convulsions may occur at the time of injury or may appear weeks, months or years subsequently, and the extent of the injury is not always an indication as to whether or not epilepsy will develop. Occasionally convulsive seizures may be eliminated on the resection of the focal scars or the evacuation of traumatic cysts, but more often than not surgical procedures for the treatment of posttraumatic epilepsy are disappointing. The

medical treatment consists of medication, the use of sedatives such as phenobarbital and bromides. A medical regimen of dehydration and the use of a ketogenic diet have offered assistance in the treatment of epilepsy.

Posttraumatic Psychoses.—Posttraumatic psychoses, though not common, sometimes follow extensive injuries of the frontal lobe. Permanent palsies likewise follow similar injuries of the motor cortex or pathways. Traumatized cranial nerves usually recover unless the nerve has been lacerated.

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DISCUSSION (*Abstract*)

Dr. Ralph M. Stuck, Denver, Colo.—Dr Adson has recommended the use of thorium dioxide in cerebral aneurysms. Recently Reeves and I have reported that this drug is dangerous from several angles, particularly where there is a question of blood clotting as in this case. Following its injection there is a definite reduction in the platelet count and in one case, with which I am familiar, a cerebral aneurysm had stopped bleeding and began to bleed again immediately following the injection of thorium dioxide. Very shortly the patient died.

A few of the late dangerous effects of the drug should also be considered. Until sufficient time has elapsed to evaluate the dangerous effects of this drug it should be used with the utmost care. The alpha ray, which is the most dangerous factor in it, is a ray the effect of which is noticed less than a millimeter from the source. However, its destructive power (ionizing power) is about ten thousand times that of the gamma ray of radium with which we are familiar. Already fibrosis has been demonstrated by several workers using this drug.

No long-lived radioactive substance should be injected into the body if the patient's span of life is more than a year or two. It should also be recalled that this drug was not accepted by the Council on Pharmacy and Chemistry when it was reviewed in 1932.

Dr. Ernest Sachs, St. Louis, Mo.—Time permits my taking up only one or two of the numerous points that Dr. Adson has brought out in his paper. One that has interested me a great deal and is frequently disturbing is the true evaluation of the posttraumatic complaints that patients who have had head injuries describe. These symptoms are not only important from the patient's point of view, but also have to be considered from the compensation angle. There is no question that a patient may complain of intense headaches and dizziness and on neurologic examination show no positive findings of any sort, no evidence of any disturbance of the nervous system. Many of these patients on x-ray study show no sign of a fracture. If the case is a compensation case, the surgeon has to determine, if possible, whether the symptoms the patient complains of are being exaggerated for compensation purposes. Of course, if they are, the patient will never cease to complain until the case has been settled, and he knows he has received all the financial aid he can hope to get. Experience with many such cases will often enable one properly to evaluate the symptoms. In general, I think it is wise to urge the patient to try to do some work and see how he stands it.

In the matter of treating these patients, little can be done after the symptoms have been present a long time; prevention at the time of the accident is the important thing and this consists in adequate rest at the time of the injury; it is our rule to keep patients who have had a head injury, even if there is no sign of fracture, in bed three weeks. If at that time they have no symptoms, we allow them to get up. The treatment that Penfield has recommended, which Dr. Adson referred to, of injecting air through the spine, so-called encephalogram, in my experience only rarely is of help and then only in those cases in which the patient has very intense headache which is localized to one particular region.

THE PRESENT DAY TREATMENT OF HYDROCELE*

WITH EMPHASIS ON THE INJECTION TREATMENT

By J. ULLMAN REAVES, M.D.
Mobile, Alabama

Normally we find a few drops of straw-colored fluid between the visceral and parietal layers of the tunica which serves as a lubricant to facilitate the gliding around of the testicle within the scrotum. When this fluid exists in abnormal amount we term the condition a hydrocele. This collection of serous fluid within the tunica vaginalis is the commonest tumor of the male reproductive tract and may occur at any age. It is most frequently seen in middle aged or elderly men, and is unconnected with disease of the testes or epididymis. If the hydrocele is recent the wall of the sac is thin and elastic and the sac itself translucent, but in old standing cases we may find the sac greatly thickened and as hard as cartilage. Occasionally we find some calcareous plaques deposited in these thickened walls.

Subjectively, chronic hydroceles rarely cause any pain or tenderness unless a complicating infection is present. The rapidity and size of the growth varies. Discomfort is produced from their weight, and if they are of a large size, invagination of the penis into the encompassing tumor makes urination difficult with attendant excoriation of the skin by the urine. Thomas[1] reports a case which contained sixteen pints of fluid after eleven months' duration; others have been reported containing varying quantities of fluid up to five gallons.

The testicle is developed as a retroperitoneal abdominal organ and in making its descent into the scrotum on the gubernaculum testis it carries with it the anterior covering of peritoneum. This is to become the visceral layer of the tunica vaginalis, and as the testis passes through the internal ring and down the inguinal canal it pushes before it a serous pouch of parietal peritoneum which is known as the processus funicularis, and which in turn becomes the parietal layer of the tunica vaginalis. After the descent of the testicle this peritoneal funicular process is normally obliterated from the internal ring down to a point just proximal to the epididymis. Should this funicular process fail to be obliterated, a number of abnormalities are possible, particularly hydrocele and hernia formation. The degree of obliteration which takes place or fails to take place has much to do with the variety of hydrocele presented in a given case.

Campbell[2] divides the end result of this funicular process into twelve types, one being its complete closure and obliteration, wherein it becomes a fibrous cord, and then eleven types of hydrocele formation according to the degree of obliteration encountered, namely:

(1) Congenital hydrocele, where the hydrocele sac is connected with the abdominal cavity because the funicular process remains patent. (2) This same type accompanied with hernia extending down the patent funicular process. (3) Infantile hydrocele, where the funicular process obliterates for only a portion of the distance between the internal and external ring, allowing the hydrocele sac of the tunica vaginalis to protrude up the inguinal canal for a certain distance beyond the external ring, but not to or within the internal ring. (4) Hydrocele of an undescended testicle which does not allow the hydrocele sac to connect with the abdominal cavity on account of the complete obliteration or closure of the funicular process for a short distance below the internal ring. (5) Hydrocele of the testicle within the tunica vaginalis. (6) Hydrocele of the epididymis within the tunica vaginalis. In both of these conditions (5 and 6) the funicular process has been obliterated. (7) Bilocular type of hydrocele. (8) Hydrocele of the cord, with complete closure or obliteration of the funicular process above and below the hydrocele sac. (9) Hydrocele of the hernial sac, with obliteration of the funicular process between the hydrocele sac and the tunica vaginalis. (10) Hydrocele of the tunica vaginalis with hernia, the funicular process having been obliterated for a distance between the two. (11) Hydrocele of the cord with hernia, in which a portion of the funicular process is closed or obliterated between the hydrocele sac and the tunica vaginalis.

It is not our purpose to discuss differential diagnosis, but we must know whether the tumor presenting is a simple hydrocele either alone or associated with (1) hernia, (2) spermatocele, (3) hematocele, (4) chylocele, (5) gumma, (6) edema of chronic passive congestion, or (7) neoplasm, or whether it is one or more of the above named conditions unaccompanied by hydrocele formation.

Hydrocele is also a pathologic entity found in the female, but the known facts concerning it are not sufficient to establish its etiology. This condition derives its clinical importance from its resemblance to an inguinal hernia. Should we arrive at a preoperative diagnosis in these cases we must keep the possibility of a hydrocele

*Read in Section on Urology, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

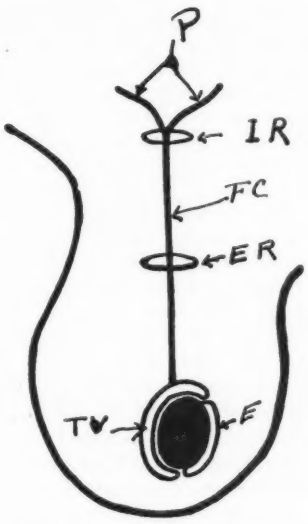

Fig. A

Normal relationship of the scrotal contents beginning from above at the peritoneum. P, peritoneum; IR, internal ring; FC, funicular process closed; ER, external ring; TV, tunica vaginalis; E, epididymis.

in mind in the presence of a tense, elastic fluctuating swelling, situated either in the inguinal canal or extending below the external ring, with a history of the tumor's developing slowly without any known cause, and an absence of impulse on coughing.

A few decades ago, work done by Zuckerkandl, Niemann, Bergmann and Sachs established the existence of a vaginal process of peritoneum in the female as not uncommon, but whether it is congenital or acquired still remains to be proven. Should these processes of peritoneum form into sacs containing fluid they are spoken of as hydrocele in the female, hydrocele of the canal of Nuck, or hydrocele Muliebris.

Rignoli divides all classes of hydrocele in women into five groups, which very completely describe the various anatomical conditions encountered:

(1) Diffuse hydrocele or hydrocele of the cellular tissue about the round ligament.

(2) An accumulation of fluid in the canal of Nuck, communicating with the free peritoneal cavity.

(3) An encysted hydrocele, being an accumulation of fluid in the vaginal process without a communication with the peritoneal cavity.

(4) An encysted hydrocele in the connective tissue about the round ligament, a condition similar to group 1.

(5) An accumulation of fluid in an old hernial sac.

We also have femoral hydrocele in the female, the sacs of which have had almost every abdominal viscus found within them. Whether they are congenital or acquired is unknown, and their etiology is not yet established.

"Time marches on," and we find it impossible to coordinate all of the ideas advanced for the cure of hydrocele. Possibly we have not advanced to the method of approach which can and will be adopted by all. To date we find that practically every turn or advancement taken by the art of healing has been or is being used to relieve or cure hydrocele. Radical surgical operations on hydrocele have been done since the ancient Roman, Celsus, incised and drained the sac, but only the more adventurous attempted surgery in those days of lack of knowledge of the principles of antisepsis. Dating from antiquity there have always been men who advocated injection of different fluids into the sac itself, with and without aspiration of the sac contents, or excision of part of the sac. Saltpeter solution, red wine, iodine, phenol, sublimate dissolved in lime water, hot and cold water, and more recently mercurochrome were the solutions most favored. Internal medication was found to

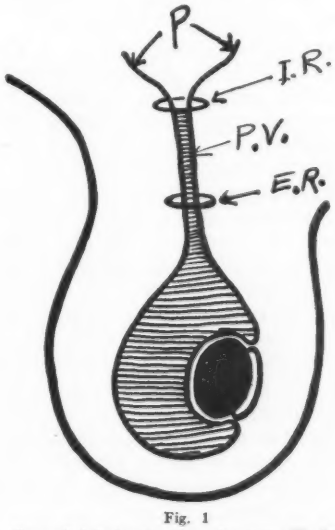

Fig. 1

Congenital hydrocele: P, peritoneum; IR, internal ring; PV, patent funicular process; ER, external ring.

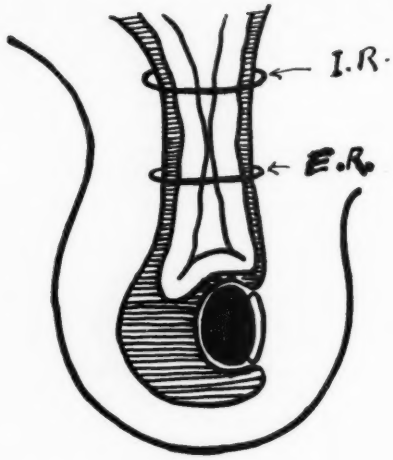

Fig. 2
Congenital hydrocele with hernia: IR, internal ring; ER, external ring.

have no value in combating hydrocele. Bergmann, in 1885, was one of the first to practice excision of the sac. Guiteras[3] said, in 1912:

"The best methods of operating upon hydroceles of the tunica vaginalis are the Jabolet and Andrews methods, the former of which I have generally used. The next best method is by the injection of 95 per cent carbolic into the sac of the tunica after the method of Coley. The injection method with iodine or carbolic can be used in all cases except the congenital."

This was recommended in spite of the pain caused by the injection of tincture of iodine into the hydrocele sac with its accompanying disability necessitating hospitalization of from eight to nine days. There is much less pain when phenol is injected within the hydrocele sac. In the hands of some clinicians the patient experiences no symptoms to keep him from being ambulatory. In the hands of others the pain and disability may require rest in bed with or without hospitalization for from one to four days. It is quite possible that some of the failures encountered with either iodine or phenol were due to their causing so much discomfort and pain that the patient did not permit sufficient manipulation of the testicle within the tunica vaginalis to secure the necessary wide distribution of the iodine or phenol within the sac necessary for contact with all the surface of the tunica vaginalis.

According to the literature, the recent revival of interest manifested in the management of hydrocele is not all on the side of the injection treatment. Surgeons realized that the older operative procedures were bad for one reason or another, and Dr. Hugh Hampton Young[4] demonstrated the fact that since there are many layers which compose the hydrocele sac, with care these layers, eight or ten in number, may be separately incised, so that as each layer is cut its edges retract carrying their respective blood vessels away from the operative field without their being divided or requiring ligation to prevent subsequent hemorrhage. The thickest layer encountered is the subserosa which is immediately external to the very thin serosa of the tunica vaginalis. When this subserosa layer is gone through and retraction takes place it leaves a sac so thin that you can actually see through it. The opening of this sac and its removal, ligating the cut edge of the sac sectionally leaves the blood vessels undisturbed and avoids the danger of postoperative hemorrhage, which is one of the drawbacks to other operative methods. This hemorrhage may occur, according to Campbell, even when hemostasis is apparently complete.

Autoserotherapy has been extensively employed in recent years by foreign investigators, but there is little American literature on the subject. This method consists of total or partial aspiration of the sac, followed by subcutaneous or intramuscular injection of the patient with his own fluid.

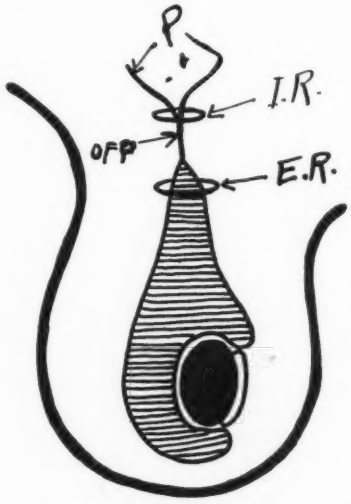

Fig. 3
Infantile hydrocele: P, peritoneum; IR, internal ring; OFP, obliterated funicular process; ER, external ring.

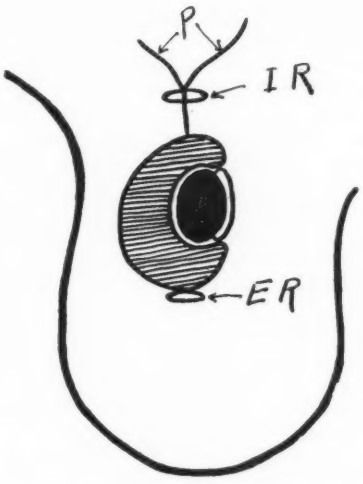

Fig. 4
Hydrocele of undescended testicle: P, peritoneum; IR, internal ring; ER, external ring.

Aspiration of the sac contents followed by the introduction of foreign bodies, such as rubber tubes, silk, catgut and metal strips, was extensively done for a time, and in 1937 Livermore[5] advocated tapping the sac with a large trocar, completely draining it and then inserting in all portions of the cavity tape which had first been saturated with one of the solutions used by some to inject within the sac after aspiration.

By-products often prove of great value. Such was the case when intravenous therapy came upon the horizon and our errors in technic demonstrated how thoroughly veins could be obliterated. Again, modern medicine turned its thoughts to perfecting the injection treatment of hydrocele by using the solutions which were found safe and suitable for the injection and cure of varicose veins. Gray[6] and others tried sodium chloride, Porritt and also Levi used sodium morrhuate, Pybus[7] reported five cases treated with quinine hydrochloride and urethane, Thornhill used quinine dihydrochloride, others used quinine dihydrochloride with a little salicylic acid added (0.5 per cent). Kilbourne and Murry[8] say that the ideal solution for the injection of hydrocele should make surgery unnecessary in most cases, should produce no pain or disability, should be nontoxic, bacteriocidal to prevent infection, efficient to prevent recurrence, without danger of causing hemorrhage into the sac, and the patient should be ambulatory and at work while he is receiving it.

We accepted the findings of Kilbourne and Murry, Ewell[9,10] and others that the solution best fitting the above requirements thus far produced was quinine hydrochloride 13.33 per cent and urethane 6.66 per cent. I have yet to find a patient with an idiosyncrasy to quinine, though undoubtedly this occurs. But there is a marked delay in the absorption of an injected dye within the hydrocele sac and this delayed absorption undoubtedly occurs when quinine urethane is injected.

We believe the contraindications to the injection treatment of hydrocele are confined to a very small per cent of the total and can be listed as (1) the presence of certain types of hernia, (2) the presence of coexisting disease necessitating surgery, (3) cases of abdominoscrotal hydrocele, and (4) when pus or blood is found within the aspirated fluid.

A properly performed aspiration and injection of a hydrocele sac is a safe and practically benign procedure. The technic is simple and accidents should therefore be rare. First, remember that the scrotum is so dirty that its preoperative disinfection is practically impossible. Keyes has said: "Get it as clean as possible, then handle it as the dirtiest thing in the world." After the scrotum is cleansed with the patient

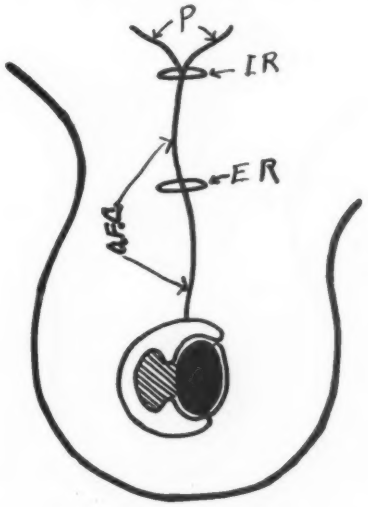

Fig. 5
Hydrocele of testicle: P, peritoneum; IR, internal ring; ER, external ring; OFC, obliterated funicular process.

prone and draped with sterile towels a point for making our puncture is located away from the testicle and avoiding blood vessels in the scrotum. This point is infiltrated with procaine, then using an 18-gauge needle as designed by Ewell the sac is entered by tunneling under the skin; the needle obturator is withdrawn and syringe attached and the fluid thoroughly aspirated. These two steps are important. The first serves to prevent leakage of the quinine solution, and the second serves to keep the quinine solution from being diluted within the sac. The fluid is then examined microscopically for by-products of inflammation, as the operator palpates the scrotal contents for evidence of abnormality. If these findings are negative and we are sure the needle has not slipped out of the sac, the first syringe is disconnected from the indwelling needle and another syringe connected which contains either two or four c. c. of quinine urethane solution, according to the size of the hydrocele, and this is injected within the sac and the needle withdrawn. Very little discomfort if any is experienced by the patient from this procedure, making it easy for the solution thus injected to be spread to all of the endothelium of the tunica vaginalis by manipulating gently the testicle within the sac of the tunica. We then have the patient wear a well-fitting suspensory, which is put on and adjusted by us in the office immediately after the treatment is finished.

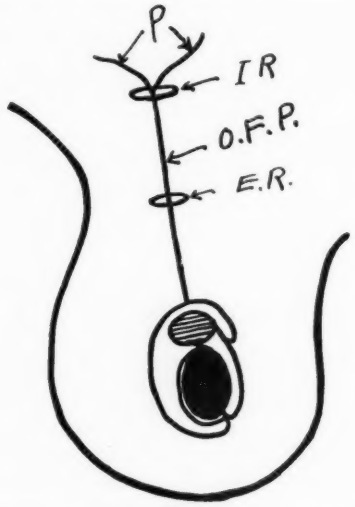

Fig. 6
Hydrocele of epididymis: P, peritoneum; IR, internal ring; OFP, obliterated funicular process; ER, external ring.

The patient is able to attend to his usual duties and returns to us after a week. In each of our cases there was found a reaccumulation of fluid within the sac which upon aspiration was darker in color. The injection is repeated, using the same technic, and usually 2 c. c. of

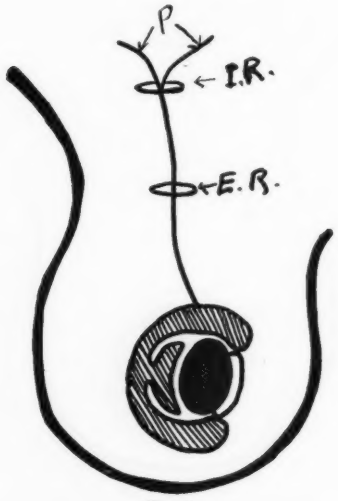

Fig. 7
Bilocular type hydrocele: P, peritoneum; IR, internal ring; ER, external ring.

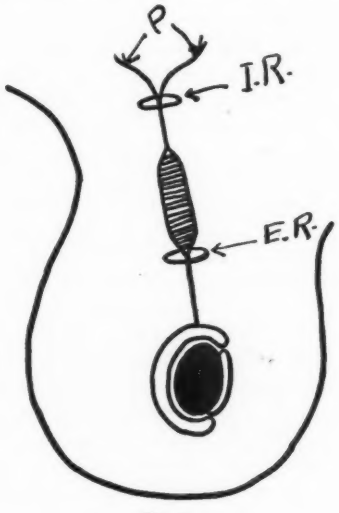

Fig. 8
Hydrocele of cord: P, peritoneum; IR, internal ring; ER, external ring.

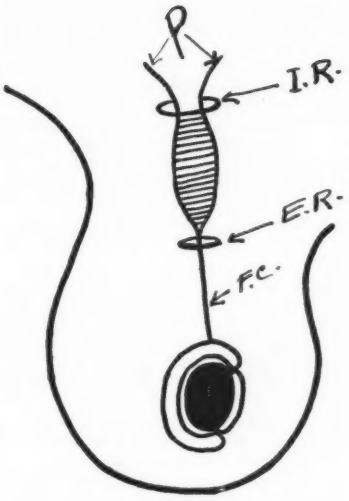

Fig. 9
Hydrocele of hernial sac: P, peritoneum; IR, internal ring; ER, external ring; FC, funicular process closed.

quinine and urethane is sufficient for the second injection. Should the fluid reaccumulate following the second injection and fail to be reabsorbed within three weeks, the treatment is again repeated. In many cases one injection will suffice, others require two, three and even four injections, the patients being ambulatory and about their work all the while.

Epididymo-orchitis has been reported following injection treatment and should be the only complication encountered. If this condition does occur it has no deleterious after effects. To date we have experienced this complication in four of our cases, and in each it subsided within ten days under palliative measures which kept the patient ambulatory.

We have treated by this method twenty-nine hydroceles in twenty-six patients, which have now remained cured for more than a year without any recurrences. The duration of the hydroceles ranged from six months to 44 years. The youngest patient was 36 years of age, the oldest 66. We have had no experience with hydrocele in children. Those that we have seen or followed either healed or disappeared spontaneously without interference. There are still cases of hydrocele which have to be approached surgically, but very few of these are seen by the average urologist. Even in some cases where a pathologic condition coexists requiring surgery of an open operative type, we believe the patients' best interests demand that the hydrocele should be cured first by the injection method.

The injection method of treating hydrocele is now advanced sufficiently to make us consider it first for all cases except those found unsuitable by careful history and painstaking examination. The technic is simple but thorough. The patient can be assured that he can con-

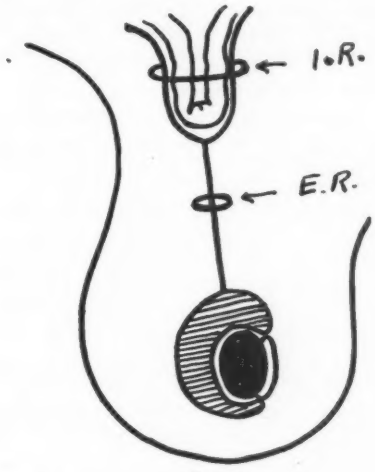

Fig. 10
Hydrocele of tunica vaginalis with hernia: IR, internal ring; ER, external ring.

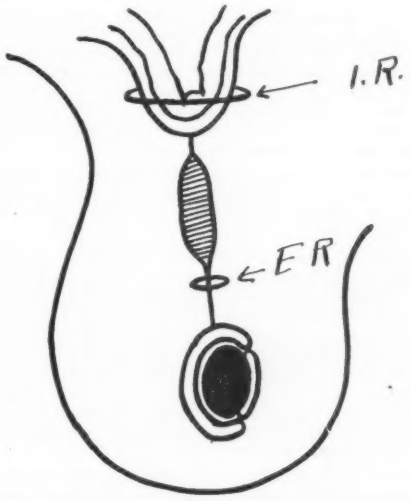

Fig. 11
Hydrocele of cord with hernia: IR, internal ring; ER, external ring.

tinue his vocation without interference from the procedure. Reaction, if present, is very mild and the patient can leave your office within fifteen to thirty minutes feeling better than when he entered. Hospitalization with its accompanying economic loss is avoided. Patients are more willing to undergo the injection treatment, thereby obtaining relief much earlier in the course of the disease, thus obviating pathologic changes brought about by long-continued pressure within the tunica vaginalis, as well as avoiding the discomfort which arises in adjacent organs because of the mechanical obstruction.

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DISCUSSION (*Abstract*)

Dr. H. King Wade, Hot Springs, Ark.—Herman states that the majority of hydroceles are acquired and have their origin either as a complication of injury, which is the symptomatic type, or appear without any known cause, the idiopathic type. The symptomatic type can be either acute or chronic and is associated with lesions of the scrotal contents, such as acute inflammations, injuries and neoplasms.

The acute hydrocele usually reabsorbs as the inflammatory process in the testicle or epididymis subsides. Sometimes tapping is necessary to relieve tension in traumatic cases.

Chronic symptomatic hydroceles occurring in syphilis, tuberculosis and tumor are to be differentiated from the idiopathic type. The idiopathic hydrocele is of undetermined origin. Campbell is convinced that they are secondary to asymptomatic epididymitis. There is usually no history of injury or disease in these cases and the fluid is suggestive of a transudate rather than an exudate. Chronic hydrocele may follow the wearing of a truss or operation for varicocele or hernia. Douglas states that hydrocele follows operations for varicocele in 35 per cent of the cases.

Pathology, symptoms and physical characteristics have been carefully covered by the essayist. I will touch upon differential diagnosis only briefly.

Uncomplicated idiopathic hydroceles are to be differentiated from those associated with hernia, varicocele and symptomatic hydroceles (injuries, inflammations, neoplasms). The light test, or transillumination, in many instances is sufficient for differentiation. Puncture is not to be done if transillumination is not possible. Cases suitable for puncture make it possible to do a very careful examination by palpation of the empty sac contents. Great care is to be exercised if tapping is done where there is an associated hernia. Scrotal edema due to any cause is manifested by pitting on pressure over the area. Idiopathic hydroceles do not disappear spontaneously. Spontaneous cures may occur in children, but the majority of these are of the congenital variety.

Tapping is a valuable measure in (1) diagnosing symptomatic hydrocele; (2) as a possible cure in hydrocele in children other than the congenital type; (3) as a palliative measure in uncomplicated hydrocele in the adult. Repeated tapping may be done in the aged with cardiac lesions or other lesions contraindicating radical treatment.

Treatment by injection as outlined by the essayist is the treatment of choice in most instances. It is not without some danger if improperly performed, as infection or even necrosis of the testicle may occur. Quinine hydrochloride and urethane have been satisfactory in my hands, giving less pain and discomfort than iodine or phenol.

Bruns' investigation shows that recurrence takes place in 12.3 per cent of cases following the injection method, while recurrences following the radical operation are indeed rare.

THE TREATMENT OF CONGENITAL SYPHILIS WITH AN INTRAVENOUS ARSENICAL*

AN ANALYSIS OF 204 CLINICAL CASES

By JAMES K. HOWLES, M.D.
New Orleans, Louisiana

In spite of the endeavors of investigators in the field of experimental syphilology to obtain a relatively nontoxic arsenical preparation which would approach the panacean ideal of Ehrlich, proof has repeatedly been advanced of the futility of hoping to overcome such a deeply entrenched disease as syphilis by a single sterilizing injection. That ideal will probably never be realized. On the other hand, the current trend of investigation, which has been both followed and promoted by commercial laboratories, has resulted in the production of a steady stream of antisyphilitic preparations. Some of them are very effective, some of them are less effective,

*Read in Section on Dermatology and Syphilology, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

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and many of them are not new, but are simply old agents renamed or old agents improved in certain respects.

The evaluation of such products has always furnished a problem, and Stokes[1] long ago proposed an admirable program for its solution. He advised that every antisyphilitic drug be studied uniformly and routinely as follows:

(1) A complete study should be made of its chemical and physical properties.

(2) Its toxicity should be determined.

(3) Its chemotherapeutic index for experimental investigation should be determined.

(4) A thorough clinical trial should be made by as many workers as possible under conditions which provide for the careful keeping of records, combined clinical and laboratory study of many patients, and an extended period of observation under controlled conditions to determine its permanent value.

It is significant that Stokes listed the clinical trial last, not first, and surrounded the clinical study with definite restrictions and qualifications.

Fox,[2] in his excellent report on the use of sulpharsphenamine, concurred in Stokes' program and added further requirements. For a new arsenical to merit consideration and ultimate acceptance as an antisyphilitic therapeutic agent, he said, it must possess the following properties:

(1) A therapeutic value in the tolerated dose superior to that possessed by the older arsphenamines in the attempted cure of the disease.

(2) A particular quality in arresting and healing certain of the later manifestations of the disease resistant to other forms of treatment.

(3) A decided usefulness in those cases unable to receive arsenic in the older forms because of toxic reactions of one kind or another.

(4) Superior availability because of simplification of administration by other than the intravenous method, without, of course, loss of therapeutic value or increase of toxicity.

It is interesting and impressive to note that investigators who have worked with meta-amino-parahydroxyphenyl arsine hydrochloride have followed this program almost to the letter. Time does not permit a detailed report of their studies, but they must not be passed over without some brief comment.

Meta-amino-parahydroxyphenyl arsine oxide ("mapharsen") is not a new drug. It may properly be described as a synthetic preparation which includes in a convenient and available form the chemical properties of arsine oxide. This product of oxidation was considered by Ehrlich and his associates to be the important sterilizing agent in the arsenical therapy of syphilis, and the passage of time has served to confirm their observations.

HISTORICAL DATA

Tatum and Cooper[3 4] did the first work with this drug and patented it under its present name. In their experiments with rabbits they found its sterilizing therapeutic index to be higher than the index of neoarsphenamine, and for the most part other observers have confirmed their conclusions. Raiziss and Severac[5] do not accept their findings. On the basis of their own studies in rabbit syphilis they reported a therapeutic index of 0.92 for "mapharsen" as compared with an index

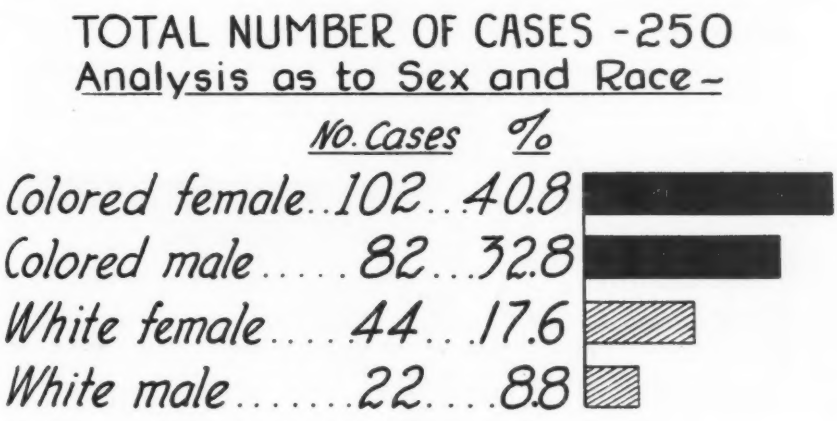

Chart 1

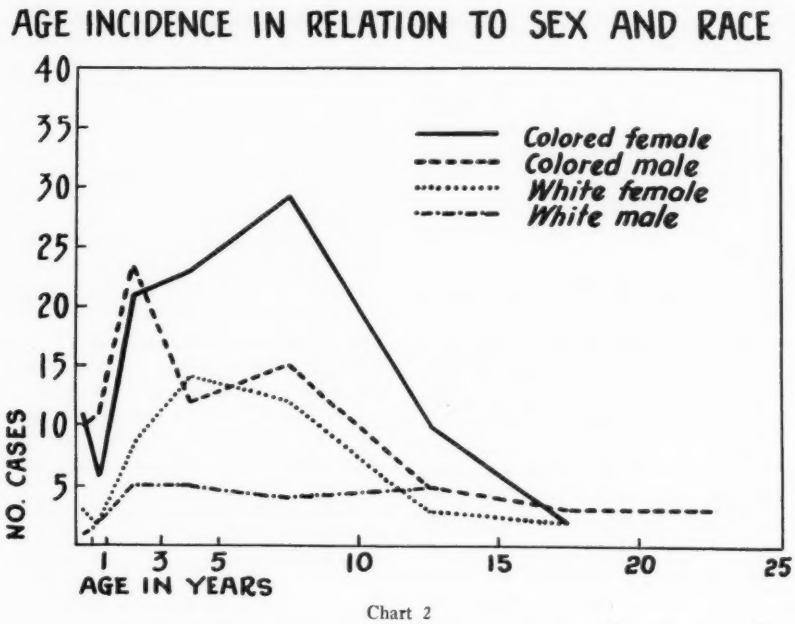

Chart 2

ANALYSIS AS TO AGE GROUP

INFANTILE GROUP - PRENATAL SYPHILIS
up to 3 yrs. ~ 103 cases

	No. cases	%
Colored female	38	37.0
Colored male	44	42.7
White female	13	12.6
White male	8	7.7

TARDIVE GROUP. PRENATAL SYPHILIS
3 yrs. & older ~ 147 cases

	No. cases	%
Colored female	64	43.5
Colored male	38	25.8
White female	31	21.0
White male	14	9.5

Chart 3

of 5 for neoarsphenamine, and concluded, with Ehrlich, that however valuable it might be, it was too toxic for use in human syphilis.

Most observers, as we have said, do not share this view. Gruhzit,[6 7 8] for instance, in his independent studies as well as in a collective therapeutic survey, found the curative index of "mapharsen" to be 4 against 3.7 for neoarsphenamine. He also found that 1 mg. of "mapharsen" caused syphilitic lesions to heal and spirochetes to disappear from open syphilitic lesions as rapidly as did 10 mg. of neoarsphenamine.

Other important contributions should be mentioned, including: the early pharmacologic and chemotherapeutic studies of Schamberg, Kolmer and Brown,[9] Eagle and Mendelsohn,[10] Pedlow and Reiner,[11] and Roth and Creswell;[12] the quantitative studies of Voegtlin and Smith,[13] Kolmer,[14] Pfeiffer and Tatum,[15] and Rosenthal;[16] and Pfeiffer and Tatum's[15] excellent report on the action of "mapharsen" on the reticulo-endothelial system.

The first extensive clinical study of "mapharsen" was made by Foerster and his co-workers.[17] Miller, Epstein and Simpson,[18] Peterson,[19] Stokes and Beerman,[20] Astrachan,[21] Moore,[22] Parsons,[23] Schmidt and Taylor,[24] Wells,[25] and Cole and Palmer,[26] among others, have made important contributions to the evaluation of the drug in the treatment of early human syphilis, while Netherton,[27] Appel,[28] Cady[29] and Chargin and Leifer[30] have performed the same task for late acquired syphilis. Deserving of special mention is the report of Cole and his associates[31] on the importance of the cutaneous or local Herxheimer reaction as an index of the therapeutic efficiency of "mapharsen" in early syphilis.

Much of the clinical work on "mapharsen" has been concerned with its toxicity, and most workers concur with Jordon and Traenkle[32] in their conclusion that its toxic effects are less than those of neoarsphenamine. There is occasional disagreement on this point. Kulchar and Barnett,[33] for instance, found that although "mapharsen" produced slightly more rapid healing of cutaneous lesions than did neoarsphena-

Chart 4

SYPHILITIC MANIFESTATIONS
Tardive Group - 147 Cases

Eye involvement
Skeletal
Cutaneous & mucous membranes } See separate slides.

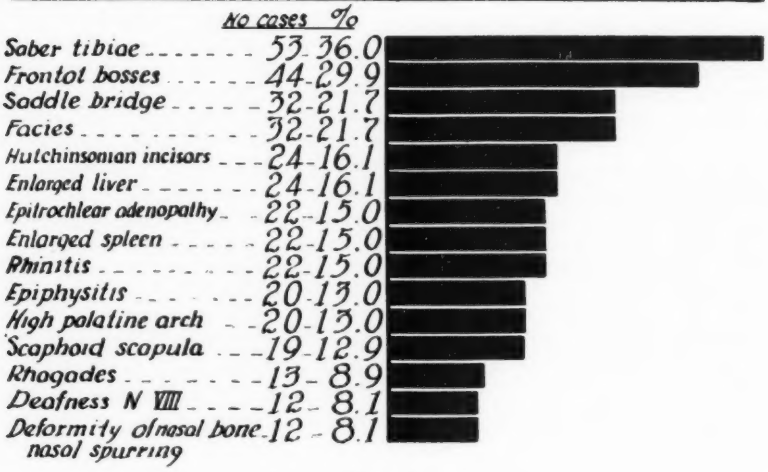

Chart 5

CONGENITAL SYPHILITIC EYE MANIFESTATIONS
Tardive Group

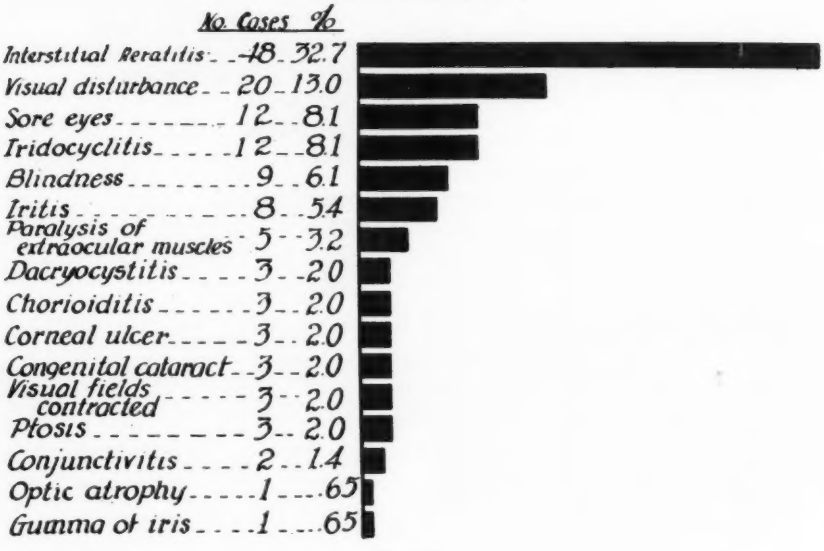

Chart 6

mine, reactions were more common when it was used and the reversal of the serologic reaction was slower. The value of this particular report is lessened by the fact that it is based on only 1,270 injections in only 56 cases of early syphilis.

Studies of the reactions following "mapharsen" therapy have been made by Schoch,[34] Falconer, Epstein and Wever,[35] Jordon and Traenkle,[82] and Cole.[36] All of these writers indicate that the toxicity of the drug is relatively low, and most of them imply that there is a tendency on the part of investigators to overemphasize early, mild complications. This, of course, is a not unwholesome tendency when one is studying and evaluating a new drug.

Moore and his associates,[37] in an important

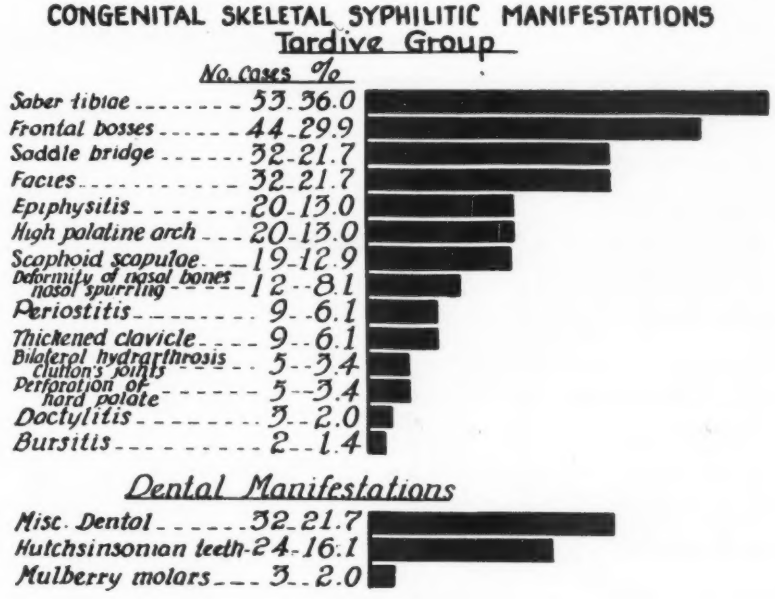
CONGENITAL SKELETAL SYPHILITIC MANIFESTATIONS
Tardive Group
No. Cases %
Saber tibiae 53 36.0
Frontal bosses 44 29.9
Saddle bridge 32 21.7
Facies 32 21.7
Epiphysitis 20 13.0
High palatine arch 20 13.0
Scaphoid scapulae 19 12.9
Deformity of nasal bones nasal spurring 12 8.1
Periostitis 9 6.1
Thickened clavicle 9 6.1
Bilateral hydrarthrosis Clutton's joints 5 3.4
Perforation of hard palate 5 3.4
Dactylitis 3 2.0
Bursitis 2 1.4
Dental Manifestations
Misc. Dental 32 21.7
Hutchinsonian teeth 24 16.1
Mulberry molars 3 2.0

Chart 7

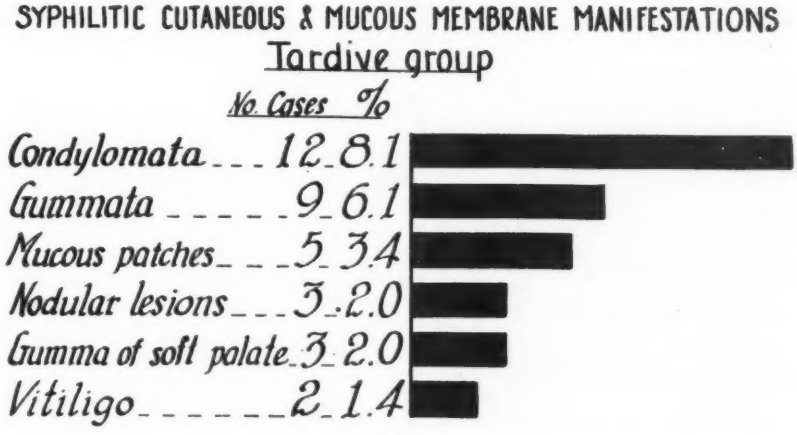

Chart 8

comparative study of five different arsenical preparations used in early syphilis, found that the average response to "mapharsen" and to the older arsphenamine were almost identical, and that the response to neoarsphenamine was slightly less. Other studies, of which time does not permit a more detailed mention, do not seem to bear out the rather generally accepted rule that the higher the oxidation of an arsenical, the less toxic and the less effective it is as a spirocheticidal agent.

From this brief survey of the work which has

Charts 9 and 10

been done with "mapharsen," it is clear that there has been an earnest endeavor to carry out the criteria of evaluation laid down by Stokes and by Fox. In particular, a great deal of work has been done on the treatment of early syphilis with "mapharsen," and a considerable amount of work has been done on its use in late visceral syphilis and neurosyphilis. On the other hand, with the exception of Morgan's[88] studies, no extensive work has been done on the use of the drug in prenatal and congenital syphilis, an important field which warrants careful observation.

PERSONAL STUDIES

Selection of Cases.—This contribution deals

PATIENTS TREATED WITH INTRAVENOUS "MAPHARSEN"
59 Cases

Age Groups of Patients	No. of Patients	Average No. of Injections	Average Total Dosage "Mapharsen"	Average Single Dose of "Mapharsen"	Blood Wassermann Reversed to Negative		Blood Wassermann Remained Positive	
					No. Patients	Per Ct.	No. Patients	Per Ct.
Early 1 to 3 yrs.	29	18.2	364 Mgm.	20 Mgm.	18	62.0	11	37.9
Tardive 3 to 5 yrs.	20	22.1	552 Mgm.	25 Mgm.	12	60.0	8	40.0
5 to 10 yrs.	10	26.5	1060 Mgm.	40 Mgm.	5	50.0	5	50.0

Chart 11

PATIENTS TREATED WITH INTRAVENOUS "MAPHARSEN" AND BISMUTH SUBSALICYLATE—145 CASES

Age Group of Patients	No. of Patients	Average No. of Injections "Mapharsen"	Average Total Amount of "Mapharsen"	Average Dose of "Mapharsen"	Blood Wassermann Reversed to Negative		Blood Wassermann Remained Positive	
					No. Patients	Per Ct.	No. Patients	Per Ct.
Early 1 to 3 yrs.	28	19.4	388 Mgm.	20 Mgm. 45 Mgm. Bi	20	71.4	8	28.6
Tardive 3 to 5 yrs.	34	21.5	602 Mgm.	28 Mgm. 70 Mgm. Bi	22	64.7	12	35.3
5 to 10 yrs.	50	25.4	1016 Mgm.	40 Mgm. 70 Mgm. Bi	26	52.0	24	48.0
10 to 15 yrs.	23	28.2	1692 Mgm.	60 Mgm. 135 Mgm. Bi	13	56.5	10	43.5
15 to 20 yrs.	7	18.2	1092 Mgm.	60 Mgm. 135 Mgm. Bi	3	42.9	4	57.1
20 to 25 yrs.	3	22.2	1332 Mgm.	60 Mgm. 135 Mgm. Bi	2	66.6	1	33.3

Chart 12

with the results of intravenous "mapharsen" therapy in prenatal and congenital syphilis. It is based on a study of 204 cases from the outpatient dispensaries of Charity Hospital, in the antisyphilitic clinic of which an average of 1,500 patients are treated weekly. It includes also a control study of 46 infants under 1 year of age who were treated by intramuscular sulpharsphenamine combined with mercury inunctions.

A word should be said at this point about the method of therapy employed. For a long time I have been impressed by the apparent ease with which Dr. Charles Dennie, of Kansas City, has carried out intravenous arsenical therapy in syphilitic infants and children. This method is ordinarily considered too difficult in young children, yet Dr. Dennie has for many years employed it without difficulty, and his excellent results leave no doubt of its value in congenital and prenatal syphilis.

Following his example, we have used this method almost routinely in children over one year of age and have arrived at his conclusion that it is a safe and effective method, whose application is attended by no special difficulty. We have also employed it frequently in infants and in children under 1 year of age, but have not chosen to include such patients in this report for obvious reasons: intravenous administration, though entirely practical in very young children, is more difficult than in older children, and the necessarily large number of cases in which infiltration occurs might lead, we felt, to false impressions of results.

Our cases are also selective in another respect. No patients are included over 1 year of age who had not positive blood Wassermanns when treatment was instituted. This restriction was laid down in order that we might have a scientific basis of comparison on which to estimate the serologic and clinical response to treatment. In the patients under 1 year of age who served as a control group no special attention was paid to the blood Wassermann, for the tendency of its reversal in newborn infants is generally admitted. The completeness of this study was made possible by the excellent follow-up work of an efficient social service department. The state law, which makes the treatment of syphilitic children mandatory, was invoked in a few particularly obstinate cases.

Regimen of Therapy and Observation.—A

SULPHARSPHENAMINE INTRAMUSCULARLY AND MERCURY INUNCTIONS
All Patients Under 1 Year of Age

Duration of Treatment	No. of Patients	Per Cent of Total	Blood Wassermann Reversed to Negative	Per Cent of Total	Blood Wassermann Remained Positive	Per Cent of Total	Blood Wassermann Negative from Onset	Per Cent of Total
Less than 6 mos.	8	17.4	3	6.5	4	8.7	1	2.2
6 mos. to 1 yr.	27	58.7	13	28.2	12	26.0	2	4.3
Over 1 yr.	11	23.9	8	17.4	2	4.3	1	2.2

Total number of patients 46
Total number of injections 1344

Average dosage, .015 gms. 1½ decigrams sulpharsphenamine.
Average number injections per patients, 28.5.
Asymptomatic cases, 13.

Reactions

Mild gastro-intestinal upsets	6
Severe gastro-intestinal upsets	4
Prolonged pain at site of injection	7
Generalized dermatitis (arsenical)	1
Localized dermatitis (mercurial)	2

Chart 13

routine plan of examination and treatment is followed in our clinic. A complete examination is made, which includes the usual history and physical examination, as well as a pediatric consultation. Consultations with other specialists are employed as indications arise. The routine laboratory work includes a urinalysis, a stool examination, and a blood Wassermann study, which is repeated at regular intervals. A blood study and a spinal fluid examination are made if indications are present.

Routine spinal fluid examinations are done on all cases of acquired syphilis seen in our clinics, but this procedure was carried out only on special indications in the group of cases included in this report. If the children could have been admitted to the hospital, the test could have been carried out routinely, but it is not a safe ambulatory procedure in young children, and for the last two years the limited facilities resulting from the construction of the new hospital have made it impossible to admit any but urgent cases. On the other hand, no patient, regardless of age, is discharged until a spinal fluid examination has been made, and this examination is repeated yearly for three years at least. The few cases in this group in which spinal fluid examinations were done are not conclusive, and the studies at the time of discharge are still too few to be reported at this time.

Patients in the infantile group are weighed at each visit and stool examinations and urinalyses are repeated as necessary. Dietary regulation is attempted and general therapeutic suggestions are made on the basis of the findings at each visit and the progress as reported by the mother or guardian.

Three general plans of therapy were employed: with intravenous "mapharsen" alone (59 cases); with intravenous "mapharsen" and bismuth subsalicylate (145 cases); and with intramuscular sulpharsphenamine and mercury inunctions (46 cases, this being the control group previously mentioned of children under 1 year of age).

The injections of "mapharsen" were given weekly. When the combined treatment with "mapharsen" and a heavy metal was employed,

IMMEDIATE TOXIC REACTIONS
Mild Degree

Type of Reaction	"Mapharsen" 1276 Injections		"Mapharsen" and Bi Subsalicylate 3387 Injections		Total Injections "Mapharsen" 4673 Total Reactions	
	No.	Per Ct.	No.	Per Ct.	No.	Per Ct.
Nausea	65	5.09	164	4.84	239	5.11
Nausea & emesis	43	3.37	95	2.80	138	2.95
Diarrhea	17	1.33	32	.94	49	1.05
Chills	3	.25	9	.27	12	.26
Salivation	0	0	13	.38	13	.28
Gingivitis	0	0	11	.32	11	.24
Pains in teeth	0	0	7	.21	7	.15
Pruritis, mild	3	.25	4	.12	7	.15
Headache	9	.71	13	.38	22	.47
Dizziness	7	.55	10	.30	17	.36
Totals	147	10.55	358	10.56	515	11.02

Chart 14

IMMEDIATE TOXIC REACTIONS
Severe Degree

Type of Reaction	"Mapharsen" 1276 Injections		"Mapharsen" and Bi Subsalicylate 3387 Injections		Total "Mapharsen" Injections	
	No.	Per Ct.	No.	Per Ct.	No.	Per Ct.
Erythema with pruritis	1	.08	3	.09	4	.09
Nausea with emesis (severe)	2	.15	3	.09	5	.11
Chills and fever	2	.15	5	.15	5	.11
Urticaria with erythema	1	.08	2	.06	3	.06
Totals	6	.46	13	.39	17	

Chart 15

DELAYED TOXIC REACTIONS

Type of Reaction	"Mapharsen" 1276 Injections		"Mapharsen" and Bi Subsalicylate 3387 Injections		Total Maph. Injections 4673. Total Reactions	
	No.	Per Ct.	No.	Per Ct.	No.	Per Ct.
Jaundice	1	.08	0	0	1	.02
Acute nephrosis	0	0	1	.03	1	.02
Involvement of hemopoietic system	1	.08	1	.03	2	.04
Albuminuria	0	0	2	.06	2	.04
Purpura (simplex)	0	0	1	.03	1	.02
Polyuria	0	0	3	.09	3	.06
Totals	2		8		10	

Chart 16

the treatment was also given weekly, the intravenous and intramuscular injections being given on the same day. In the group under 1 year of age sulpharsphenamine was used intramuscularly at weekly intervals, and mercury inunctions six days out of each week. The average amount of mercurial ointment (50 per cent) prescribed was 0.5 grams. The average doses of the other drugs are set forth in the charts and need not be repeated here. The injections were made by the interns and residents assigned to the clinic, but only at the direction of the attending staff physician, who personally saw every patient included in this report before every treatment.

General Data.—Most of these charts are clear in themselves and need no special discussion. The race, sex, and age incidence are presented in *Charts 1, 2* and *3*. *Chart 4* lists the syphilitic manifestations in the infantile group, and *Chart 5* in the tardive group, which includes the patients over 1 year of age. *Charts 6, 7* and *8* list the syphilitic changes affecting the eye, the bony skeleton, the teeth, and the skin and mucous membranes. All findings were confirmed by the appropriate specialists.

Charts 9 and *10* list a group of findings which in our opinion are incidental and not inherent in the syphilis itself. This conclusion is perhaps open to question, but it is based on our careful study of the individual patients, and we think it is sound.

Clinical and Serologic Response to Treatment.—It may be said in general that the drugs used were well tolerated and that the clinical responses were as good as or even better than the serologic responses. This confirms the reports in the literature, all of which make it clear that meta-amino-parahydroxyphenyl arsine hydrochloride is well tolerated in comparison with other arsenical derivatives.

Charts 11 and *12* set forth the serologic responses in the 59 cases treated with intravenous "mapharsen" and in the 145 cases treated with intravenous "mapharsen" plus bismuth subsalicylate. *Chart 13* lists the serologic response in the 46 patients under 1 year of age who were treated with sulpharsphenamine intramuscularly and mercury inunctions, and also lists the reactions to treatment in this group. No exhaustive study was made of these reactions, for numerous studies have already been made on this phase of the therapy, and our primary concern was with "mapharsen," as we have already pointed out.

The immediate toxic reactions in the patients treated with "mapharsen" are set forth in *Chart 14*. At first glance they may seem to be rather numerous, but the figures are not precisely indicative of the true state of affairs. It must be remembered that when one is dealing with young infants and young children, the slightest manipulation may upset their equilibrium temporarily and cause such phenomena as vomiting and diarrhea. It may fairly be said that all of these reactions were mild and transient.

On the other hand, as *Chart 15* shows, there was a very low incidence of severe reactions. This may be attributed to the greater tolerance to antisyphilitic therapy of young individuals, who are relatively unscarred from the standpoint of the visceral sequelae of syphilis. In such cases there is a rapid regeneration of cellular tissue and a lack of the visceral damage, particularly in the liver and kidneys, which is com-

TECHNICAL COMPLICATIONS

Type of Complications	"Mapharsen" 1276		"Mapharsen" and Bi 3387		Total "Mapharsen" 4673	
	No.	Per Ct.	No.	Per Ct.	No.	Per Ct.
Pains in arms	31	2.43	42	1.24	73	1.56
Venous sclerosis	1	.08	1	.03	2	.04
Extravasation Extravenous injection	18	1.41	21	.62	39	.83
Intramuscular abscess	0	0	3	.09	3	.06
Totals	50		67		117	

Chart 17

INCIDENCE OF REACTIONS

	Per Ct.
Mild, immediate	
"Mapharsen"	10.55
"Mapharsen" and bismuth subsalicylate	10.56
Severe, immediate	
"Mapharsen"	0.46
"Mapharsen" and bismuth subsalicylate	0.39
Delayed	
"Mapharsen"	0.16
"Mapharsen" and bismuth subsalicylate	0.24
Technical complications	
"Mapharsen"	3.92
"Mapharsen" and bismuth subsalicylate	1.98

Chart 18

monly found in adults, either as the result of specific infection or as part of the natural processes of growing old.

The delayed toxic reactions, as shown in *Chart 16,* were also of a mild and transient character in practically every instance. The technical reactions (*Chart 17*) were naturally more frequent than would be expected in adult syphilitics treated by the intravenous method. On the other hand, if one considers the difficulties inherent in this method when it is employed in infants and young children, the wonder is that the number is not larger. There was no instance of severe slough or deformity as the result of extravasation of "mapharsen," and the local reactions were milder than those usually noted when similar accidents occur with neoarsphenamine.

In *Charts 18* and *19* is given a summary of the incidence of the reactions and of the serologic response to treatment, which needs no special comment.

SUMMARY AND CONCLUSIONS

(1) The good results which follow the intravenous use of "mapharsen" in prenatal and congenital syphilis would seem to merit its acceptance as a standard mode of therapy in such cases. The addition of bismuth subsalicylate to the "mapharsen" therapy produces even more satisfactory results.

(2) The mildness of the local reactions which follow technical accidents with this mode of therapy furnishes an additional argument for its use as an intravenous arsenical agent.

(3) The low incidence of severe reactions, whether immediate or delayed, is evidence of its high therapeutic index. Sound proof already exists of its spirocheticidal action.

(4) The combined method of treatment ("mapharsen" and bismuth subsalicylate) is further justified by the excellent tolerance to it of children, whose visceral state is good.

(5) The very high blood Wassermann re-

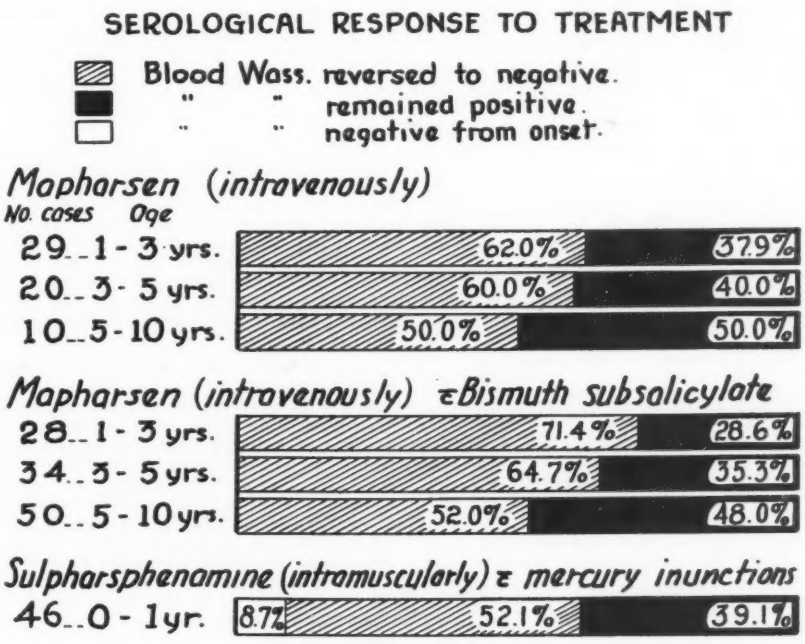

Chart 19

versal in our series can be attributed to the combined method of treatment. The excellent follow-up which we were able to obtain also played an important part in our results.

(6) We plan to continue our present studies with the idea of reporting them at further intervals after prolonged treatment, rest periods, and complete serologic follow-ups.

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*Acknowledgment is made of the courtesy of the Parke, Davis Company, which furnished us with the "mapharsen" used in this study and cooperated with us in other ways.

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DISCUSSION (*Abstract*)

Dr. Harry M. Robinson, Baltimore, Md.—Dr. Howles' results with meta-amino parahydroxyphenyl arsine in early congenital syphilis are encouraging and will go far toward establishing this drug as an effective antisyphilitic measure. We have employed "mapharsen" since 1932 in the treatment of syphilis in adults, that is, in late congenital and in acquired syphilis. Its effectiveness in tardive congenital syphilis can be gauged only by its effect on the few active late lesions usually encountered, of which interstitial keratitis and gummata are the commonest.

Our results are in agreement with those of Dr. Howles that it is an effective spirocheticide. In our clinic we have shown that surface *Spirocheta pallida* disappeared in an average of six hours after administration of the drug and that objective lesions involuted as rapidly with this drug as with any of the other trivalent arsenicals, except arsphenamine. We have also found that, with the exception of arsphenamine, "mapharsen," employed in early syphilis, reduced a positive serologic test to negative as frequently as the other arsphenamines. On the other hand, as the positive serologic tests in cases of late congenital syphilis are rarely reduced to negative by the other trivalent arsenicals, "mapharsen" has shown no greater power in this respect.

I note that Dr. Howles does not stress interim treatment in his paper. Has the author used "mapharsen" alone, or has bismuth been used concurrently or as an interim course of treatment?

It has been my experience that, although untoward reactions are less frequent with this drug than with any of the other arsphenamines, nevertheless these reactions are increased in frequency if bismuth is given concurrently.

Dr. Elmo D. French, Miami, Fla.—I should like to ask Dr. Howles if he used the external jugular route for administration of the arsenical in these cases.

Dr. Howles (closing).—Part of our patients were treated with bismuth and the arsine compound concurrently and in another group we used meta-amino para-hydroxyphenyl arsine alone.

Dr. French asked about the external jugular route of administration. We find this a very easy means of giving the drug and when no veins are prominent in the forearm we rely on one external jugular administration as a method of choice. When the child's head is held flexed over the end of the table and it is encouraged to cry the external jugular vein stands out quite prominently. We have sometimes relied on intravenous administration to veins of the scalp in children with very prominent veins in that locality, but we try to avoid this, as the other areas offer better fixation of the veins. Of course, no injections of arsenicals or heavy metals are encouraged into the fontannelles.

The incidence of accidents with bismuth and the arsine compound was mentioned. Very thin mature individuals showed far more reaction from the intramuscular injections of insoluble bismuth than did the better developed children.

Probably the reason for the low instance of reactions in this group of cases is the fact that all our cases were children and they naturally have much better liver and kidney reserve. This in turn is no doubt due to the fact that they have no excessive scarring of the viscera, which plays a major part in reaction to the heavy metals and arsenicals. Much scarring is due to coexisting diseases which are found frequently in older people. In short, the tolerance of the children is better.

PURPURA ANNULARIS TELANGIECTODES WITH A REPORT OF TWO ADDITIONAL CASES*

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and
V. A. HALL, M.D.
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The paucity of reported cases of Majocchi's disease, especially in our immediate vicinity, and the unique histologic picture presented by one, seem to justify the report of these two cases.

Case 1.—Mrs. C. S., aged 44, a housewife and resident of Tennessee, was born in that state of American parentage. Her father died of heart disease at the age of 77. Her mother died following an injury. A negative history was obtained in regard to the presence of tuberculosis and diabetes in any members of the family.

The patient had the usual diseases of childhood and had had pneumonia three times. Menstruation began at the age of 13 and was normal until three years previous to her present complaint. There was one child and a history of one miscarriage. In March, 1934, the patient had an attack of uterine bleeding which lasted one month. Anterior pituitary sex hormone was administered, the patient admitted to the hospital, and pelvic laparotomy done. The appendix was removed and supravaginal hysterectomy and right salpingo-oophorectomy were performed. The uterus presented one small fibroid, the right tube was a small hydrosalpinx and the right ovary cystic. Convalescence was uneventful. The patient was again admitted to the hospital in April, 1936, complaining of lower lumbar pain and procidentia of the cervix. The cervical stump was removed and cystocele and rectocele repaired.

She was first seen by one of us (Dr. Emmett R. Hall) on November 7, 1936, complaining of an unsightly eruption on the legs of three months' duration. All subjective symptoms were lacking, except that she had radiating pains in both legs.

On examination the patient appeared to be highly intelligent and free from all neurotic tendencies. The mucous membranes were pale and anemic, but presented no lesions. Blood pressure was 100 systolic, 60 diastolic, the chest and abdomen normal; varicose veins were absent.

The eruption was distributed over all surfaces of the legs, being most profuse around the ankles. The earliest lesions were macular, varied in size from that of a pinhead to a pea, were a bright red to copper in color and equally distributed over the upper one-third of the legs. The majority of the lesions, however, were the size of a penny, involved the lower two-thirds of the legs and contained numerous hemorrhagic puncta, the latter being most marked on the periphery. The centers were somewhat depressed, were yellow to brown in color, slightly tender on pressure, and presented a small amount of furfuraceous scaling. All were discreet and configuration was lacking. The oldest ones showed a definite pearly white scarring with an absence of scaling. A hypertrophic tendency was noticed in several, but later observations revealed that these lesions also became depressed. Diascopic pressure showed only a paling in color.

Kahn and Kline reactions were negative. Blood examination showed a normal leukocyte total and differential and a mild secondary anemia. Coagulation and bleeding time was not done. Urinalysis was essentially negative. A roentgenogram of the teeth failed to detect any defect.

The patient was referred to Dr. Campbell's orthopedic clinic for lumbar and leg pains, where a diagnosis was made of chronic hypertrophic osteoarthritis of the second lumbar vertebra and proliferative arthritis of the sacro-iliac joints. The report in detail was as follows:

"There is infiltration in both sacro-iliac joints, no widening or separation. The second lumbar vertebra shows osteophyte formation with marginal osteitis of the posterior and inferior part of the body. There is no spondylolisthesis of the fifth lumbar vertebra."

The histologic section was examined by Dr. George

*Read by title, Section on Dermatology and Syphilology, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

M. Mackee,[1] whose interpretation was as follows: "Extending from the upper cutis through the mid cutis into the deep cutis there are sharply defined cellular masses which appear to be infiltrating between the collagenous bundles. These masses are made up chiefly of epithelioid cells with a sprinkling of round cells throughout the cell masses. There is no surrounding inflammatory reaction. Some of the masses show granular degeneration. There is no increase in the number of blood vessels, though a number of the deeper vessels are thickened. Those of the subpapillary plexus are dilated and a few suggest telangiectasia in their distribution. A few of the superficial vessels take a little brighter red stain than the surrounding tissue and suggest hyaline degeneration, though this is not definite."

The patient was advised to take sun baths and after receiving a marked sun tan in the summer of 1937 there still remained some activity. When she visited the office again in January, 1938, a definite improvement was noted. A short time later a spinal brace was applied for her arthritic condition. Immediately there was rapid improvement and a clearing of all lesions. This continued until July, 1938, at which time she had a new attack, but milder and less extensive. This recurrence followed the administration of a so-called tonic containing iron and arsenic. When she was last seen in August of this year the eruption had cleared entirely, but definite depressed scarring remained.

Case 2.—M. F., a single woman, aged 21, native of Tennessee, was a nurse. The patient's mother and father were living and well. One brother died of pneumonia at the age of 7; one sister was living and in good health. There were no known tuberculous infections in the family, but exposure had been ample through her occupation. The patient had had the usual childhood diseases. Her tonsils were removed several years previously. Careful questioning in regard to luetic infection elicited a negative history and all manifestations of rheumatism were denied.

Two months before she came under our observation, the patient noticed several "ringworm-like" lesions on both ankl s. Others developed rapidly to involve the legs and lower two-thirds of the thighs. These first lesions were pink to red in color, round to oval in shape, and were not accompanied by subjective sensations.

The patient was a well nourished, healthy and intelligent individual. No varicose veins were present and no stigmata of syphilis or tuberculosis were observed. The mucous membranes were normal. On all surfaces of the legs the lesions were confluent and presented various configurations; on the thighs they were discreet and fewer in number. Scaling was generalized on the former, but limited to the individual lesions in the latter. The majority of the lesions were macular, varied in size from a pinhead to a penny, in color a bright red to brown, oval to round in shape, and they had no apparent relation to the hair follicles. Infiltration was lacking and color was only partially expressed. Telangiectatic puncta were scattered throughout, but most marked on the periphery. Some of the older lesions showed a brownish yellow pigmentation in the center with some suggestion of atrophy. There was no apparent alopecia. However, the patient stated that there was some loss of hair.

Histologic examination showed the epithelium to be normal, except for a mild hyperplasia. The corium of the skin was infiltrated with lymphocytes, plasma cells, and large mononuclear cells. The arterioles and the capillaries were found to be thick of wall and partially obliterated. There was much small round cell infiltration in the wall of the small vessels and in the surrounding tissue in a perivascular arrangement. No hemorrhage was observed.

In August, one month after the patient's first visit and three months after onset, a few new lesions of the same character appeared on the lower portion of the upper one-third of the thighs. Quinine sulphate was given in daily doses of 10 grains, and no change was noted the following week. However, two weeks later the entire eruption was improved and rapid involution occurred. A week later all activity had apparently ceased and only small atrophic areas were observed. To date there has been no recurrence.

DISCUSSION

Purpura annularis telangiectodes was first described as a clinical entity by Majocchi in 1887. He outlined and described the clinical characteristics which today serve as a basis for a diagnosis. Any case presented must more or less conform to these principles, enumerated as follows:[2]

"(1) Small rose or reddish-blue spots, composed of capillary dilatations and followed by small hemorrhages, without preceding hyperemia, without apparent infiltration of the skin and always in close connection with the hair follicles.

"(2) Slow progressive development of the eruption.

"(3) Constant manner of development away from the center of the macular spots, producing the well marked annular configurations.

"(4) Symmetrical distribution of the eruption.

"(5) Limitation of the disease to the extremities, especially the lower ones.

"(6) Absence of itching or any other sensory disturbance.

"(7) Ending in slight atrophy of the skin."

Hemorrhagic puncta were present in all lesions in both of the above cases with a tendency to congregate at the periphery as clearing occurred in the center. Hyperemia or acute inflammatory signs were not observed. In contrast to the usual absence of infiltration, our first patient presented several old lesions about the ankles which were definitely infiltrated, tender to pressure and showed a tendency to hypertrophic scar formation. Later these lesions flattened and were finally depressed. In neither case was follicular involvement predominant.

Slow progressive development was characteristic of both, requiring a period of from four to five months for the eruption to reach its height in the first patient, and three months in the second. Involution was rapid only in the second patient.

Annular lesions predominated in both cases. In the first, the individual lesions were discreet and widely separated; in the second, numerous configurations were formed on the legs in addition to the annular lesions on the thighs. In both the eruption was symmetrical and bilateral.

Subjective symptoms in one patient were absent. She denied that pain, aching or even weakness preceded the eruption. There was an absence of itching and no tenderness on pressure. All systemic symptoms were lacking. The eruption in the first, as stated in the history, was preceded by severe lumbar aching, radiating pains in the legs, a secondary anemia, generalized weakness and mild pruritus at the site of the eruption. There was also some tenderness to pressure in the individual lesions. We cannot say to what degree the systemic symptoms were associated with the eruption, because of the orthopedic and gynecologic diseases which occurred previous to and at the time of the skin disease. Atrophy was marked in the older patient, depressed, non-pigmented scars remaining at the site of the most active lesions, but it was less marked in the younger patient, in fact, barely detectable. There was complete loss of hair in the former and only partial loss in the latter.

ETIOLOGY

Several theories as to the etiology of purpura annularis telangiectodes have been advanced. Of these one of the first was a syphilitic origin. Both Majocchi and MacKee were able to exclude syphilis as a possible cause. MacKee[2] says:

> "While many, perhaps all of the histologic alterations of the disease may be found, at times, in the various stages of syphilis, yet the histologic picture in its entirety does not suggest syphilis. One is impressed with the fact that purpura annularis telangiectodes is a totally different disease, both clinically and histologically."

Both of our patients showed negative serologic tests while in the active stage, and no stigmata of syphilis were found on physical examination. We are of the opinion that syphilis played no part either directly or indirectly in the production of the eruptions.

Tuberculosis has likewise been rejected. Guinea pig inoculations by Pacini and others gave negative results. Recently Way[3] reported the finding of acid-fast bacilli, but even he was in doubt as to their being tubercle bacilli. In our second case the tuberculin test was negative and in both, physical examination failed to reveal any signs of tuberculosis.

The third and most acceptable theory is that the condition is toxic in origin. As Scholtz[4] says, "Recent observations suggest that the etiology can be variable." Infected tonsils and sinuses, suppression of lactation, gonorrheal prostatitis, various forms of arthritis, mercurial medication, and various other clinical and pathologic findings have been associated with the eruption.

In our first patient, the primary eruption was associated with a productive osteo-arthritis. After application of a brace for the arthritic condition the eruption rapidly improved. The second attack followed the administration of a so-called tonic containing iron and arsenic. The recurrence was also accompanied by severe lumbar pains and an exacerbation of the arthritic manifestations with which the primary attack was ushered in. We are of the opinion that the skin manifestations were directly associated with the osteo-arthritis, secondary to it, and only a part of the general clinical picture. In the second case no associated disease could be found.

HISTOLOGY

The histological picture in the section from the first case is somewhat confusing. The only major feature consistent with the diagnosis is the panarteritis and possibly some hyaline degeneration of the arterial walls. The absence of hemorrhage, arterial sacculations, widely dilated capillaries and perivascular infiltration is quite contrary to the clinical history. The histological nodules containing epithelioid cells are as Weidman[5] and MacKee[1] suggest, a sarcoid type of tissue reaction. It was MacKee's opinion that the section suggested a possibility of leprosy, with no definite evidence of Majocchi's disease. Weidman was impressed by the resemblance of the same histologic section to that of Boeck's sarcoid, but after reviewing the clinical history, he suggested that the condition might be one of the special forms of Schaumann's disease. It is sufficient to say here that, although the histology may, in some respects, resemble the above conditions, the clinical characteristics are those of purpura annularis telangiectodes. The lack of more confirmative symptoms did not lead to a consideration of either diagnosis.

Pathologic study in the second section, without doubt, reveals Majocchi's purpura. The lymphocytic, plasma and large mononuclear cell infiltration, in a perivascular arrangement, together with endarteritis and periarteritis, with such obstruction of the lumen as to obliterate it,

is conclusive. When taken in conjunction with the clinical features, there is no question as to the diagnosis.

TREATMENT

Little can be said in regard to treatment. Most cases have proven resistant to any form of therapy. Tuberculin injections, mud baths, arsenic, mercury and antirheumatic remedies have been used with little or no success. MacKee observed some improvement following the use of stimulating chemicals such as resorcin. In one of our cases no treatment was given other than the application of a spinal brace for the arthritic condition. In the second patient quinine sulphate was given by mouth in 10 grain doses daily for two weeks, at the end of which time rapid improvement was observed. We are of the opinion that this was a coincidence.

SUMMARY

(1) Two cases of purpura annularis telangiectodes are reported which coincide with Majocchi's original description clinically.

(2) Histologically, a sarcoid type of reaction was observed in one case.

(3) A definite relation to productive arthritis is apparent in the first case.

(4) Improvement was noted following quinine therapy in the second patient.

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NON-POLLEN FACTORS SIMULATING SEASONAL RESPIRATORY ALLERGY*

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Seasonal allergic patients present a very serious problem, because they frequently are seen for the first time in the midst of their trouble and require careful individual study at a time when the allergist is already greatly overburdened. Quite naturally, such patients are immediately considered as suffering from sensitization to the prevailing pollens, and any reactions to other factors are likely to be regarded as of secondary or problematic importance only, until poor results with pollen therapy alone force a revision of the etiologic diagnosis. It is the purpose of this paper to review wherein some of the so-called miscellaneous factors have been so important in several of our cases that they must be regarded as the primary excitants in what otherwise appeared to be true pollinosis; in other instances they have assumed equal importance with pollens in determining seasonal symptoms.

Respiratory allergics in the coastal area of Texas may be grouped into seasons somewhat according to the following plan (*Fig. 1*): spring patients are considered to begin having trouble about the first week of February, at which time elm pollen enters the air, followed by oak, ash and sycamore in March, and the hickory-pecan group in April; grass begins in late March, complicating spring cases. Summer patients begin to have trouble from March to April, depending on their sensitivity to grass, and reach their peak in May or June; they may continue to get trouble from grass until November if the rainfall is heavy during the summer. Although occasional chenopodiales-sensitive patients are encountered in August, the majority of our fall trouble starts about September 10 with the giant and western ragweed, reaches its peak October 1 to 10, when the marsh elder enters the air, and declines by November 1. The winter season begins with the onset of cool weather in October or November and continues until April or longer. House dust in our district seems to be a very potent allergen and is responsible for the majority of trouble during the winter, but

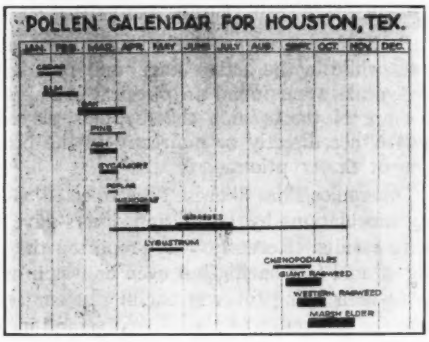

Fig. 1
Pollen calendar for Houston, Texas

*Read in Section on Allergy, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

at least one pollen, mountain cedar and its related species, causes trouble in January. It is obvious, then, that our seasons greatly overlap, and sensitization to allergens of successive seasons gives serious complications; especially is grass likely to complicate any period except the mid-winter.

One hundred and fifty patients with respiratory allergy studied over the past two years have been selected as the basis of this report. Of these, 92 have symptoms in one or more well defined seasons; the remaining 58 have definite seasonal exacerbations of perennial trouble. Symptoms of this group are distributed as follows: asthma 38, hay fever 75, hay fever and asthma 37. The results of the diagnostic surveys of these patients are summarized under the following inclusive headings: tree, grass, ragweed, chenopodiales, molds, animal danders, orris root, pyrethrum, house dust, infected and foods. All testing was done by the intracutaneous method, using 26-gauge needles, and injecting as nearly as possible 0.02 c. c. of the testing solutions. Routine testing dilutions for patients with average sensitization was 100 units[10] (1 unit equaling 0.00001 mg. protein nitrogen); sometimes testing dilutions of 1,000-unit strength were employed for sluggish skins. Foods were 0.1 mg. total nitrogen, or 1/10 dilution in the case of juicy fruits and vegetables, molds 1/500, and house dust in strengths ranging from 1/1000 to 1/10. No house dust reactions were accepted for this report unless they were positive in 1/10 dilution or weaker, as straight house dust is considered somewhat irritating and unnecessary for diagnosis of true sensitization. In cases where all testing produced skin irritation, only definitely larger, itching reactions were accepted as positive; all questionable reactions were counted as negative. In several of the cases reactions were checked by passive transfer testing. A definite effort was made toward conservatism in reporting results.

In *Table 1*, the totals of the testing reactions are plotted for the entire group; findings of other investigators are included for comparison in all the headings except molds, upon which there are no reliable statistics as yet, and for pollens and infections which are strictly local problems and for which generalized statistics are of no value.

In *Table 2*, 235 seasons actually experienced by this group are recorded with totals of important skin reactions. Grass is the most important seasonal inhalant factor (91 per cent) met with in the spring, followed by trees with 58 per cent. But it is also seen that 54 per cent of the spring patients reacted to air-borne molds, 71 per cent to danders, 83 per cent to house dust and 25 per cent to orris root, while only 5 per cent (1 patient) reacted to pyrethrum. Similarly 92 per cent of summer patients reacted to grass, and practically as many to house dust (88 per cent) and danders (66 per cent) as in the spring group. However, the percentage of mold reactions is 75, compared with 54 per cent for the spring; orris root is about the same (28 per cent) and pyrethrum is increased to 17 per cent. In the fall group 90 per cent reacted to ragweed, 72 per cent to grass, and 26 per cent to chenopodiales; to the other factors reactions occurred as follows: dust 90 per cent, molds 68

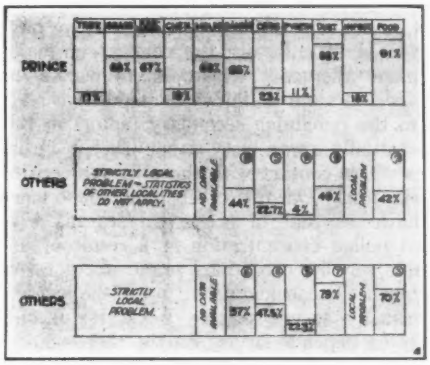

Table 1
Summary of diagnostic study of 150 cases of respiratory allergy.

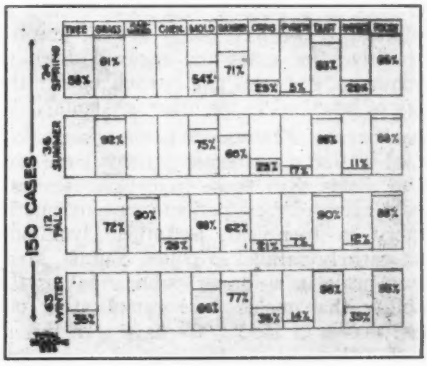

Table 2
Summary of diagnostic surveys of 150 cases, representing 235 seasons.

per cent, danders 62 per cent, orris root 21 per cent, and pyrethrum 7 per cent. In the winter only 35 per cent reacted to pollens (trees), while 98 per cent were sensitive to house dust; 77 per cent reacted to danders, 66 per cent to molds, 35 per cent to orris root, and 14 per cent to pyrethrum.

In none of the four major seasons, then, can pollens be considered as the entire cause of symptoms, although ragweed approaches such a status in the fall and grass in the spring and summer, while house dust easily assumes the most important etiologic role in the winter. Even in the three seasons where pollens are most likely to be of primary importance, the great amount of overlapping of respective sequences (*Fig. 1*) makes absolute decisions regarding etiology in many instances doubtful, and subject to the outcome of therapeutic trials with their admitted shortcomings. In the presence of many continued overlapping etiologic possibilities we have been forced to entertain the concept of major and minor allergens. It would, of course, be impossible to state definitely that positive reactions to the remaining secondary factors in this series actually mean very much except in instances where contact with the offender verified the skin test. On the other hand, experience has shown us that in occasional seasons with reduced pollen concentration as a result of unfavorable weather conditions, minor allergens require much less consideration; but in the average or unusually severe seasons a successful outcome often depends largely on the thoroughness with which secondary factors are controlled. In only two instances did positive ragweed reactions occur that could not be associated with symptoms in the fall, and grass reactions occurred once in a patient with trouble only in the winter. If we have succeeded in keeping false positives for grass and ragweed down to this minimum, does this not in itself bolster the veracity of reactions to the other inhalants?

Miscellaneous Factors.—We were somewhat surprised to find our summer patients more sensitive to molds than those from other seasons. However, many of these patients are particularly refractory to treatment, and their symptoms are not entirely parallel to pollen counts. Mention was made in a former publication[1] of the probability that molds were complicating our ragweed season in 1935. We have seen this in subsequent seasons, particularly the one just past (1938), and we expect eventually to define a "mold season" for October, possibly including November. Certainly molds grow abundantly in our damp, semitropical region and conditions for distribution of their spores are ideal when dry winds prevail after a period of rainy, foggy weather.

Pyrethrum has been considered a perennial allergen,[2] but we feel that more attention should be directed to its increased use in the late spring and summer. While our cases do not show an unusual increased sensitization to this allergen in the summer, the contact is no doubt heavier. Not only do most household sprays for use against mosquitoes contain pyrethrum, but also the ant and roach proofing methods in use in our section depend upon the thorough distribution of pyrethrum powder. In many homes it is routine to call the exterminator every year about May.*

Orris root is also more commonly used in the summer, primarily in the form of dusting powders to keep down perspiration and body odors. Many times patients go to extremes in using orris root-free rouge and face powder, but disregard entirely their dusting or body powder.

Foods.—Obviously one could not claim that variations in food sensitizations influence seasonal cases. In compiling these data for this report we were surprised to find that 91 per cent of our patients reacted to foods; but after all it is not unreasonable to expect to find the average allergic patient sensitive to one or more of the six dozen foods routinely tested.[3] If we discount these reactions by 50 per cent to allow for the recognized error in food testing, we still have a sufficiently high ratio to warn us that many of our patients are potentially food sensitive and that the diet demands constant investigation and readjustment when for no obvious reason an apparently seasonal patient responds poorly to treatment. No conscientious allergist would restrict foods permanently on the basis of positive reactions only; nevertheless, skin tests give us our most easily accessible clue in food allergy, and are probably more accurate than formal elimination diets. On the other hand, it is easy to forget that seasonal foods, such as new potatoes, fresh corn, melons and peaches may complicate early summer cases; citrus fruits[4] and nuts may aggravate ragweed hay fever, and seafood, particularly oysters, may be the cause of late fall and winter exacerbations. All of us

*Syrups poisoned with arsenic and distributed to containers in appropriate places have been found efficacious against ants; sodium fluoride is a quite satisfactory dusting powder to prevent roaches.

are familiar with the increased incidence of asthma after the overeating of holiday periods.

The colder months have long been regarded as the primary season for house dust and animal dander trouble. Our findings are in line with those of other investigators on this point; on the other hand, they clearly show that these allergens are potent sources of trouble for any seasonal patient. House dust assumes a particularly important status in the midst of our ragweed season: the same northers that bring our high pollen concentrations cause sudden temperature drops and some of our supersensitive dust cases invariably get sufficient dust contact from the quilts they take down from their clothes closets to cause severe break downs in their resistance.

Although infections in any part of the body may cause or complicate respiratory allergy, the respiratory tract itself is so often the seat of these infections that for our statistical purpose other foci may be disregarded. From a low of 11 and 12 per cent, respectively, of summer and fall cases with infection, the ratio trebles itself in the winter with 35 per cent; it falls only slightly (25 per cent) in the spring; the diagnosis of these complications was made entirely on clinical observation. The importance of infections in allergy cannot be overestimated; while some infected patients will clear from management of their allergy, most of them require prolonged attention before the allergy can be controlled.

CASE REPORTS

The following brief case histories are presented as examples of miscellaneous factors simulating or complicating true pollinosis:

Case 1.—J. W. K., aged 24, an oil field worker, with a history of asthma all his life, was seen February 24, 1938. Moderate reactions were obtained to foods, grass, oak, ragweed, house dust, feathers and heavy reactions to air-borne molds (hormodendrum, 3 species of *Aspergillus niger* and helminthosporium). Symptomatic treatment and dietary restriction had helped him through the period of diagnostic study. March 10 and 11 he had worked on a derrick in a heavy dry wind, and asthma developed so severely that 10 injections of epinephrine of minims 5 each gave no relief in 24 hours. An injection of a mixture of reacting molds and house dust gave a large reaction and aggravated his asthma temporarily.

Other mold cases and several patients sensitive to oak and grass pollens were also encountered at this time. This man had possibly obtained an overwhelming exposure to molds in his work; pollens were probably not important in his case, as he eventually did very well with mold and house dust injections.

Case 2.—Mrs. S. P., aged 26, had previously experienced hay fever only in the fall, but when she was seen July 15, 1938, she had had hay fever three weeks, progressive to asthma. Study showed reactions to ragweed, grass, house dust, kapok, pyrethrum, feathers and foods. Injections of grass, house dust, kapok, together with food restrictions, were of no avail; passive transfer testing was done, but still no improvement followed. Finally she remembered her house had been ant-and-roach-proofed during her absence in June; examination of the house revealed that pyrethrum had been employed in abundance by the exterminator. Complete removal of pyrethrum was followed by prompt improvement. Incidentally this patient has had her roaches exterminated again in September, using cyanide, and is still free from trouble.

Case 3.—C. P., aged 9, was seen March 8, 1937, with perennial asthma which was worse in cooler months; testing showed him sensitive to house dust, grass, orris root, ragweed and several foods. He has been very satisfactorily controlled with dietary and environmental management and injections of obvious allergens. On September 17, 1938, he developed severe asthma, which was thought to be caused by the increasing ragweed concentration. Questioning revealed he had been covered with an old discarded cotton quilt the night before, obtaining an extra large dust exposure therefrom. No further trouble was experienced during the ragweed season, even at its peak with ten times the pollen concentration at which he had trouble.

Case 4.—C. C., aged 16, was seen June 20, 1938, with a complaint of hay fever in the summer and fall of four years' duration. Testing showed reactions to molds, food, animal danders, house dust and ragweed. We were at a loss to explain the summer incidence of his symptoms without grass reactions. It eventually was learned, however, that he has spent the last few summers with his grandmother, where he contacted unusual amounts of feathers. Feather removal and desensitization, on the other hand, did not completely relieve him, but after dietary restrictions and house dust and mold therapy were begun, followed by ragweed injections in the fall, he was successfully controlled except for two occasions when he ingested cocoanut.

Case 5.—L. W. L., aged 26, was seen July 14, 1938, with a history of hay fever of four years' duration, from May to October. He reacted to grass only in strong concentration; but he reacted to orris root, animal danders, foods and house dust in the usual testing strengths. Usual therapy did not help him until not only his own cosmetics, but those of his fiancee, were changed, and orris root was added to his injections. This man had particular trouble at baseball games when he sat in the reserved seats, but none in the bleachers.

CONCLUSIONS

(1) Although much of the material presented in this paper is not new, it is hoped that more attention may be directed to the many non-

pollen factors which may complicate what appear to be simple cases of seasonal allergy.

(2) The increased use of pyrethrum and orris root in the summer is pointed out.

(3) It is felt that in the light of our present knowledge definite seasons for air-borne molds cannot be ascertained at this time, but their possible presence at any time must be kept in mind, particularly in the damp coastal areas.

(4) The greater incidence of infection in respiratory allergy occurring in the winter is mentioned.

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DISCUSSION (*Abstract*)

Dr. J. Harvey Black, Dallas, Texas.—Those of you who are old enough to remember the work in allergy fifteen years ago may remember some of the arguments between those living in the North and those from the South. Down here we were talking a great deal about pollen allergy, while the men in the North talked a lot about bacterial or intrinsic allergy. They were sure we were wrong and we could not agree with them. It took us some time to realize that we were talking about different conditions and that geography and climatic differences accounted for them.

Dr. Prince's paper illustrates that very beautifully. Very few of us have as much difficulty as Dr. Prince in the handling of pollen patients because of the overlapping of the pollen seasons. Most of us have this trouble with trees in the spring, but he has a grass season which runs for months from early spring until fall. I question whether Dr. Feinberg's statement made yesterday could apply to such circumstances. He said that the patient's statement concerning the time of onset of symptoms may indicate whether his trouble is due to pollen. But in Dr. Prince's territory the mold season so overlaps the pollen seasons that such a distinction would be very difficult. Those of you who are a great deal farther north probably do not realize the difficulty.

All of us are familiar with the fact that some patients do not get well on pollen therapy alone but only after attention to accessory factors do we get results.

The paper illustrates the point that because a patient is showing allergic reactions during a particular pollen season, the reaction is not necessarily the result of sensitiveness to that pollen. When a patient, having hay fever for the first time, dates the onset of symptoms to the date of the beginning of the pollen season then present, we usually assume that he has become sensitive to that particular pollen. Many times this is not true. In the case of patients with recurring seasonal allergy with a history of several years, the dates are most important. In the patient who has had no symptoms prior to the present season, the assumption that the condition is due to pollen may be entirely wrong. I suspect we have had the experience of assuming such a patient was pollen sensitive only to have the pollen season end while the patient's symptoms continued.

Dr. Prince (closing).—I really expected more criticism for reporting my high percentage of food reactions. However, if one discounts food testing by 50 per cent to allow for errors and another 20 per cent for reliability, there actually remains some 19 per cent of patients clinically food sensitive. The whole problem seems to me to center on just which patients one may say are food sensitive, and these must be selected by the trial and error method from the 90 per cent giving positive skin reactions.

INDUSTRIAL HYGIENE AS A FUNCTION OF A STATE DEPARTMENT OF HEALTH*

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and
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I believe it is well to admit at the outset that the functions of a state department of health have never been clearly defined, vary with the states, and are the basis for considerable controversy among the various interested groups. In order that there may be no misconceptions, I should like to state now that in our opinion a state department of health in any, or in all, of its activity should have neither an intention nor a desire to compete with private medical practice. Broadly speaking, it should direct its efforts toward:

(1) Investigation
(2) Coordination
(3) Education

*Read in Section on Public Health, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

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for the purpose of conserving and promoting health in all its phases.

Unfortunately, until very recently all activities of public health have been directed toward the care of the pregnant mother and her unborn child, the infant, and the young child; and the product of this protection has been pushed out into a field of chance, unprotected from all the known and unknown hazards associated with employment.[1] We now realize, however, that that large group of individuals constituting our industrial population (about forty-nine million) is entitled to an effective health service. Such realization has led to the organization of divisions of industrial hygiene, as integral parts of state health departments, entrusted with the responsibility of applying the three fundamentals to our industrial population.

Industrial hygiene has been defined as a system of rules and regulations not only for the prevention of industrial accidents and occupational diseases, but a system of rules and regulations for the conservation and promotion of health of an industrial population. It is an activity of public health rightfully belonging to a state health department which stands alone in viewing it not from the standpoint of enforcement of rules and regulations, but from the standpoint of public health in its broad aspect.

To formulate a program intelligently it is necessary to consider the worker first, as regards the relationship of his environment and occupation to disease (occupational disease), and second, from the standpoint of prevention and detection of the so-called ordinary diseases.

Such consideration must be correlated with all other activities of a public health nature and must ultimately lead to the three objectives previously mentioned, namely: investigation, coordination, and education.

The investigation which a division of industrial hygiene must concern itself with centers around:

(1) The worker, and

(2) His environment.

The personnel for such investigations must consist of physicians, nurses, dentists, engineers, chemists, toxicologists, and social workers, working together as a unit and concerning themselves, first of all, with a health inventory of our industrial population. Such an inventory will require not only pre-employment, but also periodic medical examination. In some states it may be practical for a central division of industrial hygiene to make, or to supervise the making of, such examinations; whereas, in other states this may not be advisable.[2] At any rate, the findings of such surveys should be used not only to place men properly, but also to place responsibility. Those conditions resulting from the nature of the work should be cared for and paid for by industry. All other abnormalities should be referred to the family physician for observation and treatment. County and city health officers should be informed of those individuals found to have communicable or contagious disease in order that they may take the necessary measures to protect the contacts. This is particularly true in the case of tuberculosis, venereal disease, typhoid fever, and parasitic infections. Such a practice has been successfully followed by some of our larger industries.[3 4 5 6] Such a plan makes employes more health conscious and serves to create good will between the family physician, the industrial physician, and physicians of a division of industrial hygiene.

In the State of Mississippi the physician of the Division of Industrial Hygiene makes medical examinations of factory employes. These examinations include a serological test for syphilis, blood smear for malaria, tuberculin test with x-ray examinations of positive reactors, and an accurate history of typhoid fever or other disease specified. The findings of the examination and laboratory tests are given the individual employe and when advisable the suggestion is made that he see his local physician. The health officer is furnished with a list of those individuals having a positive Wassermann or a positive diagnosis of active tuberculosis in order that he may institute the necessary public health measures to protect the contacts. The employer is also informed as to the findings and is requested to assist the employe to obtain medical advice and treatment when necessary.[2]

The keeping of accurate and uniform sickness records in industry must be encouraged and instituted. Through such records many interesting and useful observations are made, and when these are closely correlated with the findings of medical examinations and engineering surveys, they become indispensable.[7]

Physicians who consider industrial hygiene as a public health problem are not content to have only a health inventory of the employe, but they also concern themselves with:

(1) Housing

(2) Safe water and milk supply

(3) Adequate and nourishing food with a well balanced diet
(4) Proper sewage disposal
(5) Accident prevention
(6) Rest periods and the relationship of fatigue to accidents
(7) Industrial psychology
(8) Specific health problems, such as birth control, abortion control, and mental abnormalities
(9) Rehabilitation and employment of the handicapped, ably discussed by Kessler[8]
(10) Development of a sound and fair system of compensation based upon the principle that "if it is hazardous to human lives to produce an article of usefulness, then the cost of production must include the cost of health promotion."[9]

It is of interest to quote here from the report of the reference committee on consideration of the national health program at a meeting in Chicago on September 17, 1938:

"Your Committee recognizes the soundness of the principles of workmen's compensation laws and recommends the expansion of such legislation to provide for meeting the costs of illness sustained as a result of employment in industry."[10]

To "sell such activities" most effectively, a division of industrial hygiene must have available physicians who can win the confidence of industrialists, public officials, and the medical profession; can effectively organize and present to others plans for the promotion of good health; have an understanding of the principles and methods of business and business men and who have the courage, personality and knowledge to "sell" their program. In our opinion such activity should be the duty of the director, meaning thereby that the director of a division of industrial hygiene should be a physician.

The engineer and his co-workers are concerned primarily with investigating the workers' environment and associating these findings with those of the medical investigation.

Most states have found it desirable to make preliminary engineering surveys of industrial plants for the purpose of acquainting the surveyor with the materials used, by-products, finished products, and processes involved. Such surveys also reveal environmental conditions, such as:

(1) Adequacy and type of lighting
(2) Adequacy and type of ventilation
(3) Temperature and humidity
(4) Air sanitation in general
(5) Sanitation involving toilets, drinking fountains, and wash rooms
(6) Proper and safe sewage disposal
(7) Adequacy of machine guarding
(8) Fire prevention and protection
(9) Protective clothing and devices
(10) Housekeeping in general.

These findings merely indicate the potentialities of a situation and should serve as a basis for more comprehensive correlated medical and engineering studies.

The place of the engineer in such studies has been ably discussed by Bloomfield[11] and Cook.[12]

The Division of Industrial Hygiene of the Texas State Department of Health has completed a preliminary survey and is now tabulating its findings. It is our opinion that its chief value lies not so much in uncovering potential health hazards, but more particularly in the contacts which are established with industry and in the information the surveyor gains of industrial processes. The enthusiasm of the industrial hygiene engineer has been responsible, in a large measure, for directing programs along the lines of occupational disease prevention. Industrial hygiene physicians can well afford to absorb some of this enthusiasm and to assist in giving more attention to adult health conservation and promotion. It is now known that occupational diseases constitute only about 2 per cent of compensated cases and 2 per cent of total compensation costs.[13]

The report on "Medical Service in Industry and Workmen's Compensation Laws," recently published by the American College of Surgeons, reveals that for each day lost from work because of occupational disease, sixty days are lost because of industrial injury, and eight hundred and eighty-five days are lost because of non-industrial injury and illness.[14] These findings impress employers with the fact that it is the common diseases and common injuries, shall we say, nonoccupational, which are costing them tremendous sums of money.[15]

Frequently detailed chemical and toxicological studies of new chemicals are desirable. For such investigations a division of industrial hygiene must have available a well equipped laboratory manned by a personnel capable of making analyses, the results of which will command the respect of all parties. Such a laboratory must also be equipped for comprehensive and intelligent engineering studies. It is our opinion that the findings of such studies should be final, and with this thought we have expended a reasonable sum of money to develop our laboratory facilities.

The functions of correlation and coordination are as important an activity of a division of industrial hygiene as that of investigation. The findings of the engineering and medical surveys must be considered simultaneously in an attempt to determine the probable connection. Measures for the control of objectionable and harmful dusts, fumes, gases, and vapors must be recommended; and when such are instituted, the effectiveness thereof must be determined. Where possible and practical, the substitution of nontoxic chemicals and materials for toxic ones must be suggested. It is well to bear in mind, however, that industry cannot and will not tolerate impractical or costly suggestions. All plans or recommendations, therefore, which a division of industrial hygiene wishes to make to an industry for the promotion of health and the prevention of disease must be correlated with the ability and willingness of industry to pay.

And, finally, all plans must be closely correlated with all other public health activities, such as malaria, tuberculosis, venereal disease, stream pollution control and sanitary engineering. In the final analysis the effectiveness of any program of industrial hygiene will depend to a large extent upon the efficiency of the local health service.

The third major function I wish to discuss briefly is that of education. The ability to educate others requires, first, a thorough understanding of your subject; second, a sincere belief and confidence in that which you are trying to make others believe; and third, a familiarity with human psychology.

Since the personnel of a division of industrial hygiene comes in contact almost daily with labor and industry, a familiarity with, and interest in, the economics of labor and industry as well as with existing and proposed legislation affecting these groups is very essential. Certainly no one is better qualified to offer advice and suggestions relating to compensation of occupational disease than a division of industrial hygiene. In 1935 forty states introduced legislative measures for compensation.[16] Eleven states now have a general coverage act; ten a scheduled act, and two a special coverage.[17] Those states having no coverage now will undoubtedly take steps to procure it.

In considering the function of education, it is well to remember that the full support of

(1) Employer
(2) Employe and his dependents
(3) Physician and his associates
(4) Hospital and allied institutions
(5) Government, local, state and Federal

is essential before any program can be successful. Each of these groups, therefore, should be made familiar with the objectives.

It is generally conceded that the larger industries can (and many do) provide an industrial hygiene service for their employes. But smaller industries are neither familiar with the health problems, nor do they feel financially able to institute measures for the correction thereof. It is for these smaller industries in particular that a division can act as a guide and source of information.

Winslow[18] has stated that one of the principles underlying the existence of industrial hygiene is that

"the employer has a moral (and often a legal) responsibility to protect his employes against any special hazards to health which are inherent in a particular industry."

This responsibility, however, has not stimulated employers nearly so much as has the enactment of legislation for workmen's compensation. The first act, passed in 1909, was for compensation of industrial accidents. From 1909-1913, twenty-three states provided for such protection, and because of it, there was exerted a major effort for the reduction of accidents and premium rates. Statistics give us evidence of the splendid results. Legislation for the compensation of industrial accidents was followed by legislation for the compensation of occupational diseases; and although states were slow in such adoption, there are now twenty-one states and the District of Columbia where employes are so protected. Our period of depression, together with some fabulous awards in suits at common law, impressed all employers with the importance of health and its protection, as well as with the importance of eliminating occupational health hazards.[19]

Those interested in formulating a program of industrial hygiene must not forget the probable effects of income and housing upon the health of our industrial population. Certainly we must lend our assistance to those endeavoring to improve the economic status of our workers, realizing that if workers were financially able to provide themselves and their dependents with proper and adequate food, clothing, shelter and sanitary facilities, our problem would be less complex.

In summary, then, it is essential to have some central agency which will serve as a coordinating, fact-finding, and educational body, receiving reports of diseases of employes (occupational and nonoccupational); making studies for the location of potential health hazards, as well as for the severity of known hazards; determining the effectiveness of control measures; correlating environmental conditions with health; and finally disseminating the information at hand for all groups concerned for the benefit of the health and welfare of all working people. Such a program is clearly one of ethics of organized medicine in its relation to industry and the forty-nine million employes.

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DISCUSSION (*Abstract*)

Dr. Crit Pharris, Nashville, Tenn.—Recent expansion of industrial hygiene in the United States has been so rapid as to raise questions as to the circumstances responsible for it. Prior to 1934 there were only about three official industrial hygiene bureaus or divisions in the United States and they were serving approximately two or three million workers. Since then the number has grown at a rate not previously experienced, and at the present time there are approximately 28 official organizations spending more than one-half million dollars each year in providing some form of industrial hygiene service to more than thirty-five million industrial workers. Was this rapid increase in industrial hygiene work due to an increase in the industrial health hazards? Was it due to an increase of public health funds or to a greater appreciation of the importance of industrial health preservation? There is no doubt that more adequate appropriations together with an increase in the knowledge of industrial health conditions were the most significant factors. While certain types of industrial health problems are increasing, it is true, nevertheless, that the general health of the working man has improved considerably during recent years. This improvement has been attributed to the development of workmen's compensation legislation and to the fact that industrial officials are becoming increasingly aware of the fact that the health of their employes is vitally important to good business. Industries certainly have traveled a long way from the time when the detrimental environment of the so-called "sweat shops" commonly existed.

Although marked improvement has been made in the general health of the industrial worker, it still is true that health hazards in this population group are so much greater than they are among nonindustrial workers that very significant differences in certain morbidity and mortality rates can be demonstrated. The economic losses due to reduced earning capacity, lessened efficiency, and other generally unsatisfactory health experiences amount to enormous sums of money each year. It has been estimated that the annual loss due to injuries and diseases among workers amounts to five billion dollars. This price for wastage of the workers' vital resources ultimately is paid by the consuming public. So it is evident that, while much progress has been made, a great deal more effort should be expended to correct those conditions which exact such unfavorable influences upon this group of persons.

Governmental health agencies can claim comparatively little credit for the progress that has been made in industrial health conservation, but, through the inspiration and guidance of industrial hygiene officials of the United States Public Health Service and other organizations the recent expansion in this field has been very largely confined to departments of health. It is of significance to state that of the various official industrial units now existing in the United States all except two are in health departments.

The South has long been considered as an agricultural area and relatively unimportant from an industrial standpoint. However, this conception is changing due to the steadily increasing number of industries originating in the area or moving in from other sections. That Southern health officials recognize the existence of industrial hygiene problems in the South is demonstrated by the fact that there are nine industrial hygiene units already established in the South.

Dr. Cox and Dr. Nau have very ably outlined the role of industrial hygiene in a state health program.

They have visualized a type of program which should be governed by the needs for the service and facilities available for rendering it. The importance of such a procedure cannot be too strongly emphasized. The problems are not sufficiently uniform in type in the various states and neither have control facilities been developed to degrees where a uniform nation-wide type of program can be carried out.

There appear to be two somewhat extreme views concerning the type of industrial hygiene service which should be rendered. It seems to be the opinion of some authorities in this field that the truly legitimate industrial hygiene activities should be largely, if not entirely, limited to control of occupational diseases and accidents. Such control efforts would involve detailed considerations of the prevalence and incidence of such disorders, their effect upon the health of workers, and measures which should be adopted for their control. A more generalized type of service is advocated by others. They would carry on the type of work which would be very similar in scope to general child and adult hygiene, with attention being directed to such measures as communicable disease control, general sanitation, and other phases of service not unlike those being rendered through generalized public health programs. They would also be concerned with any specific occupational health problems which might arise, but would emphasize general health conservation in industry.

Both types of services have their merits and should be effective. The type which should be organized in any area should be, as the authors have indicated, determined only after an informative study of the problem has been made. It would seem that the first type of service, that dealing with specific industrial hygiene problems, should be considered the ideal one if other general health programs are sufficiently well developed to cope with nonspecific industrial health problems which might also be found in the general population. In areas not having such general community health protection, the type of industrial program should depend upon whether specific occupational health problems are of greater or less importance than the nonspecific problems.

Dr. Cox and Dr. Nau have outlined a program which incorporates both of these phases of service. Their industrial hygiene unit is definitely concerned with specific occupational health problems and also with others which directly affect the industrial worker. They have planned the work so that it will augment rather than disrupt or displace existing health services in the factory or in the community. They have very clearly emphasized the relationships which should exist between industrial hygienists and other individuals concerned. The sole objective of industrial hygiene is to promote better health of industrial workers. This should be done by investigation, coordination, and education. Such a service may be considered as a sales agency for the purpose of "selling" better industrial health to industry and labor. But the provision of such health protection is a responsibility of industry and labor, and not of the governmental industrial hygiene organization. If such a promotional service is conducted in accordance with ethical public health practices, there should be no doubt that it will be acceptable to all concerned and that definite results will be accomplished.

THE PRACTICING PHYSICIAN LOOKS AT THE PRECLINICAL SCIENCES*

By LEWELLYS F. BARKER, M.D.
Baltimore, Maryland

Since the physician who was to present this subject has been unable to be present, the Chairman, Dr. Lynch, has asked me to speak extemporaneously and briefly upon the topic. I am glad to do so, for the relative importance of the several preclinical sciences seems to me to be undergoing change. Though these sciences, physics, chemistry, biology, psychology, anatomy, physiology, physiological chemistry, pharmacology and pathology, are all of great significance for the clinical studies that follow, the time at the disposal of the student is limited and the relative amount of time that may be devoted to each preclinical science differs somewhat as medicine continues to progress.

In the old days, after brief courses in physics, chemistry and biology, the bulk of the time was devoted to anatomy and pathology, smaller amounts of time being allotted to physiology, physiological chemistry and pharmacology.

Today, a much more thorough grounding in physics, chemistry and biology than ever before has become necessary; without this, the medical student is bound to be seriously handicapped. In chemistry, the student must be prepared not only in the study of inorganic and organic compounds, but also in that of so-called physical chemistry. In biology, he needs not only a general knowledge of the animal and vegetable kingdoms, but also especial instruction in the laws of heredity, the nature of human environment, and the interrelations of constitution and surroundings. In normal psychology, the student formerly received little or no instruction; today, he should gain adequate knowledge regarding the intellect, the emotions and the will of normal human beings in order that, later on, he may profitably study the abnormalities of these that are to be discussed in the course on psychiatry, an adequate knowledge of which is still sadly lacking among general practitioners of medicine.

Though the study of anatomy (gross, microscopic and developmental) will always be essen-

*Read in Section on Medical Education, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

tial, the time allotted to it must nowadays be somewhat curtailed (in contrast with its former predominance) if the other preclinical subjects are to receive their fair share of attention. Just how anatomical studies are to be compressed within the time limits that may justifiably be devoted to them today is a perplexing problem that medical faculties are finding very difficult of solution. Various plans are being tried and, doubtless, in the coming period, experience will lead to what is really best. It may be that elective courses will be provided so that students with differing clinical aims may choose what is most advantageous for their futures; thus, the prospective surgeon, for example, may devote relatively more time to gross anatomy, whereas the prospective internist or neurologist may choose to deepen his studies of the histology of the internal organs, the endocrine glands, or the nervous system.

In pathology, the student must become acquainted not only with the gross changes that are found in the organs of persons who die of the commoner fatal maladies, but he must also study the finer microscopic alterations met with in the organs and tissues at different stages of various diseases. The pathological-clinical conferences at present provided for are most helpful, not only in stimulating interest but also in acquainting the student early with the correlations of clinical symptoms manifested during life with the bodily lesions that are demonstrable after death.

Physiology and physiological chemistry deserve relatively larger time assignments than formerly, owing to advances in our knowledge of function (as well as of the importance of the physiological approach to clinical studies) and in our understanding of the chemistry of the bodily processes. I need mention only the extraordinary progress that has been made during the past few years in our conceptions of hormonal relationships, on the one hand, and the significance of vitamins for human welfare, on the other. The chemical constitution and even the structural formulae of most of the hormones are now known, and every day we are finding out more about the sources of a whole series of vitamins, their chemical nature, the serious results that may follow upon vitamin deficiencies (avitaminoses), and the substances that may be made in the laboratories to be used instead of, or to supplement, the natural vitamins of normal diets.

Pharmacology, in turn, has a larger task to perform than ever before for the preclinical student. Though interest in some of the older drugs that were largely used may have waned, the precise physiological action (pharmacodynamics) of the more important medicinal drugs is being worked out and ever clearer indications for their proper use in the treatment of disease are being discovered. But, in addition, we are entering, at the present time, into an entirely new era of chemotherapy. Since Ehrlich's introduction of 606 for the treatment of syphilis, each year has brought new contributions to the chemical treatment of disease. Today, the medical journals are crowded with articles upon the effective treatment of streptococcal, gonococcal, meningococcal and other infections with sulfanilamide and, still more astonishing, upon the reported successful treatment of pneumonia and other pneumococcus infections with sulfapyridine! Though some time must elapse before the definitive place of these new substances in our therapeutic armamentarium has been established, the outlook seems to be very promising indeed. It will be the task of the departments of pharmacology in our medical schools to keep students and practitioners advised of the value of these and other new drugs.

The practicing physician recognizes further that the teachers of the preclinical sciences must make due provision for the training of their successors. I was much influenced by the distinguished anatomist, Franklin P. Mall, with whom I was once associated in the teaching of anatomy. He repeatedly told us that each preclinical science must, to a certain extent, be taught for its own sake, without too much emphasis upon the parts of the science that are of immediate clinical application. For each science must itself grow through research and must, in addition, through fellowships and assistantships see to it that not only opportunities for research are afforded, but also that enough men are thoroughly trained for the continuance of teaching and investigation in its particular department. This attitude seems to me to be sound; it should be supported, I think, by all who have at heart the interests of medicine as a whole.

Discussion follows paper of Dr. Ledbetter, page 973.

THE PREMEDICAL SCIENCES*

By H. L. D. KIRKHAM, M.D.
Houston, Texas

A surgeon is defined as a "medical" practitioner who performs operations or treats diseases amenable to operative measure. He has further been defined as one who cuts all that is soft, saws all that is hard, and ties all that bleeds; would not, therefore, the patient be safer in the hands of one who knew what he was cutting, sawing, and tying? Since anatomy, physiology, embryology, and pathology are the keystones for surgical practice, more than a mere academic knowledge of these branches should be attained, and this is especially true of anatomy and pathology. It may be that the importance of these subjects has been so indelibly impressed upon the writer since entering medical school that this paper may be hypercritical. It has been observed that the recent graduates who come for internships show less practical knowledge of these two most important branches than many of the other preclinical sciences of less importance surgically.

If this observation is true, what is the cause? Is the method of teaching at fault, or is the whole system weak? I should like here to distinguish between system and method. System implies limitation, something confined or stereotyped, such as the number of hours outlined for various courses. The distribution of these hours through the curriculum may be regarded as method. Too often in the past system has delayed and even prevented progress, whereas method (used in its literal sense of a "means of transit or advance") is elastic and admits rearrangement and modification.

It is interesting to peruse the catalogues of the various medical schools and note the difference in the method of presenting the preclinical sciences. Reviewing anatomy in its broad sense to include histology and embryology, we find that the actual number of hours coincides fairly well with the standard as laid down by the American Medical Association; however, there are marked differences in the distribution of these hours through the curriculum. Some schools compress all their gross anatomy into the first year, and in some instances into one semester of the first year, and give short courses of applied anatomy or neuro-anatomy in the second or third years. It is doubtful that any but a very brilliant student can grasp and retain all gross anatomy in one year, with the result that his knowledge of anatomy like the dew upon the flowers at early morn will melt and vanish with the heat and burden of the day. Some schools give no physiology in the first year, but give physiology and pathology in the second year. Since pathology is that branch of medical science which deals with disease, especially with its nature and functional and material changes caused by it, how is it possible for a student fully to understand pathology without having previously studied physiology?

These distributions of subjects may be some of the reasons why many recent graduates have a superficial knowledge of anatomy, physiology, and pathology. Could the answer to these discrepancies be solved by the adoption of a standard for all medical schools which not alone sets down the number of hours, but also the distribution of hours through the various years? With the present system a student transferring from one school to another would be faced with the problem of having more credits in some subjects and less in others.

Before the entrance requirements of medical schools were raised many subjects were taught, not so much that the students might become expert in them, but rather to teach method, for method in medicine is of paramount value. Science has been tersely described as measurement, but it might be more correct to regard it as the application of method to observation and record. It is this very application which has raised medicine to the level of a science. Perhaps the greatest master of method was Lord Bacon, whose marvelously analytical and methodical mind having reviewed not only the extent of knowledge of his own time, but also that of the ancients, evolved a system of philosophy and taught the inductive or experimental method to which science and medicine owes her greatest advances. It is not too much to say that the Baconian philosophy rendered possible the work of Harvey and his successors in rational and experimental medicine, as well as later advances in physical and chemical sciences. There should be a close bond between teaching and study,

*Read in Section on Medical Education, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

since teaching should be the control, direction, and guidance of study. A medical education requires the education and refinement of the senses, especially those of sight, hearing, and touch, and the formation of sound and logical judgment from the information obtained thereby; and it is one of the chief objects of the preclinical sciences to inculcate the importance of exactness of observation and scientific basis on which to construct the superstructure of actual medical knowledge.

The faculty of observation cannot be too fully stressed from the commencement of medical training. More mistakes are due to lack of observation than to ignorance or wrong observation. In order to impress upon the minds of students the necessity for careful observation, and at the same time to impress the importance of a thorough knowledge of the preclinical sciences, every opportunity should be seized to stress all the practical applications of apparently academic facts; for often the early impressions and teachings of a subject are those which are lasting. Nothing could be duller than the didactic study of embryology, and yet if the practical application of embryology to clinical entities can be pointed out it opens up, in many instances, new vistas and shows the young student avenues of possible research which will not alone increase his interest, but, more important still, will inculcate in him the desire for discovery of the whys and wherefores of known facts, which in turn unconsciously trains his mind for careful observation and a realization that many medical problems are as yet unsolved and may not need an elaborate laboratory to find a solution.

Sir James Paget, while a first-year student at St. Bartholomew's Hospital, discovered the parasite *Trichina spiralis* in human muscle. To quote his words on the discovery:

> "I may justly ascribe it to a habit of 'looking out' and wishing to find new things. All the men in the dissecting room, teachers included, saw the little white specks in the muscles, but I believe that I alone looked at them and observed them."

This is quoted to illustrate that in teaching students it is important, whether in preclinical or clinical subjects, to emphasize the importance of observing instead of merely seeing, and thus to lay the foundation for true investigation; for the cannons of orthodoxy are in very few cases so firmly established that new facts may not disturb them. Examples of the practical application of embryology and anatomy are too numerous to mention, but as a few simple examples a description of the tuberculum impar and the copula is of mere academic interest unless the practical application of this knowledge in its relation to the development and migration of the thyroid is explained; and mention at least made of some of the interesting pathologic conditions met with, such as thyroglossal duct cyst and aberrant thyroid when developmental processes are not quite normal. In this connection it is unfortunate that the curriculum is so full that some interest cannot be aroused in the study of comparative anatomy and comparative pathology. Without such study and the practical application of facts determined thereby, many of the fascinating, interesting and important surgical entities would have remained unknown, and there are still problems to be solved by observations in comparative anatomy and pathology. The interspersing of interesting facts in these studies in their relation to normal and diseased conditions of man may do good at least in impressing upon a student that his studies of anatomy, embryology, physiology and pathology do not, and must not, stop after the successful passing of an examination in these subjects, and will further impress upon him the value of method.

In this regard it may be wise to offer a suggestion on method in postgraduate study and reading. It is unfortunate at the various postgraduate assemblies and meetings that some of the discussion at least does not cover phases of preclinical sciences. You will possibly find highly scientific and instructive lectures given on clinical subjects, for example "The Localization and Diagnosis of Brain Tumors," or "The Management of Brachial Plexus Injuries," from which the listener could derive much benefit if he had a thorough knowledge of the anatomy of the brain or brachial plexus. The average man who has been out of school some time, and for whom these meetings are especially designed, has forgotten what little detailed anatomy he knew, and often he knows less about the pathology of the subject under discussion.

Regarding method in reading, which applies to clinical as well as preclinical subjects, and to the graduate as well as the undergraduate, it is not the actual amount read which is of value, but that part which we understand and assimi-

late into our sum of experience. In the latter part of the last century a certain medical consultant at Cambridge University, England, was recognized as being one of the best informed men of his time, not alone in his specialty but in surgery, anatomy, pathology and other branches. He was asked the secret of his method and he replied that each year he picked a standard textbook on eight subjects of the medical curriculum, including anatomy, physiology, pathology, medicine, surgery, and any specialties in which he was especially interested. The average text contains about 1,000 pages, and 1,000 pages divided by 365 makes about 20 pages per day, and since the modern textbooks are profusely illustrated these 20 pages can be easily read and thoroughly digested in thirty or forty minutes. Such reading, coupled with journal reading, tends by constant repetition to keep in mind the old traditional facts and truths of medicine and surgery, which would otherwise have been forgotten beyond recall. Too often our true and tried companion, namely, texts on anatomy and pathology, are placed upon the shelf on graduation day, only to be brought out occasionally to review material relative to a case in hand. In this connection certain maxims of the great philosopher, Lord Bacon, as translated and paraphrased by Sir Thomas Watson, may be quoted:

"Be not like the empiric ant, who collects from every side indiscriminately for present wants, nor speculative like the spider who, seeking no material from abroad, spins his web of sophistry from the recesses of his inner being; but imitate rather the praiseworthy bee, who, gathering crude honey from various flowers, stores it up within and by his own operations matures and perfects it for future use."

In recent years many new surgical procedures have been advocated and in some instances have developed into fads, only later to be cast on the scrap heap as not only impractical and useless, but sometimes, which is worse, harmful. As an example may be mentioned total thyroidectomy for uncompensated heart lesions, and some of the procedures on the sympathetic nervous system. Invariably when these procedures are analyzed we find that they are based on unsound anatomy, physiology, or both. It may be safely said that any procedure so founded is doomed to failure. If this is true, and a thorough knowledge of these preclinical sciences is not obtained and retained, how can we hope for further advance and progress in the surgical arts?

To look back through the years at the illustrious and truly great surgeons, for example Sir James Paget, Sir John Bland Sutton, John B. Deaver, James E. Thompson and names too numerous to mention, we are struck by the fact that these men are first truly great anatomists, physiologists and pathologists, and that their proficiency in surgery is builded upon their observation and knowledge of these sciences.

Therefore, in the presentation of these subjects, students should be made to realize that they are are not alone laying the foundation for their every day practice, by which they earn their livelihood, but also that by a thorough knowledge of these preclinical sciences they are making possible for themselves the study, and sometimes the solution, of questions of untold interest and value to future generations, and it is the doing of something worth-while and doing it well which in the final analysis gives much more gratification to one than mere financial reward. Some day perhaps a poet like Kipling, with his minute observation and his power of seeing deep beneath the surface, may sing the true romance of medicine as he himself has already sung of steam and the daily miracles of honest, sincere, and strenuous effort.

"When through the gates of stress and strain,
Comes forth the vast event,
The simple, sheer, sufficing same
Result of labor spent,
They that have wrought the end with ought
Be neither saint nor sage,
But men who merely did the work
For which they drew the wage."

May the teaching and study of the preclinical sciences be so thorough that a threefold purpose shall be served: first, the establishment of method and methodical minds; second, the opening of the students' eyes and minds to the broader, grander spheres of medicine than mere pecuniary gains, namely, research. Both of these will foster and further true medical or surgical advance. Lastly, let the foundation of future surgeons be as a solid rock to the end that there may be developed sounder, saner, safer surgeons.

Discussion follows paper of Dr. Ledbetter, page 973.

THE PRACTICING SURGEON LOOKS AT THE CLINICAL SCIENCES AND THE INTERNSHIP*

By S. L. LEDBETTER, JR., M.D.
Birmingham, Alabama

From the viewpoint of the practicing surgeon in the average Southern city, I know of no better way of presenting this subject than by an honest discussion of my own problems and those of my associates. These problems vary considerably in different localities. Practice in the South differs from that of the North, and conditions are not quite the same in the teaching centers and the nonteaching centers.

In the teaching hospital with a residency system the junior intern receives instruction and help from all his superiors of the house staff as well as from the visiting physicians. He attends ward rounds with his residents and staff surgeons. He is present at demonstrations to students and students' ward rounds with the teaching staff of the medical school. He even learns a great deal from the nurses. During this time, in addition to absorbing more theory, he improves his practical knowledge by the careful taking of histories and physical examinations. He likewise serves as second assistant at operations. At the end of his first year, if he has a good record, he is promoted to one of the junior residencies, and may ultimately become chief resident surgeon. If he is not among those retained for a second year, he may go into practice, take some industrial contract, or if he desires more training, accept some position as resident in a nonteaching hospital. Students graduating with the higher honors usually win the appointments as interns in the teaching hospital associated with their medical school, and since only a certain number of these appointments are available, many of the graduates must secure internships in other places.

In the nonteaching hospital there is little instruction given the intern or resident by attending physicians. He learns a great deal, of course, in a somewhat disorganized way, making diagnostic examinations, assisting the surgeons at operations, and following up cases postoperatively, but the opportunity for teaching under these conditions is scarcely adequate. In the average private hospital the staff is more or less open where any surgeon of good standing may take his patients. Also there is usually a proportionately large list of eligible staff members, most of whom average only a few patients at a time.

The hospital in which I do most of my work is a fair example of the average hospital for private patients in the South. We have found it more satisfactory to use doctors with previous internships, preferably in teaching hospitals, than to use first-year interns. This is the opinion of the department on medical education of the American Medical Association and has been wisely adopted generally. In the teaching hospital the young doctor has more experienced men at his disposal at all times, whereas when he works alone in a smaller institution he must rely most of the time on his own judgment. By far the majority of patients going into private hospitals have had all diagnostic studies made beforehand, so the intern loses this training except in acute emergencies and the few house cases assigned to him. The knowledge gained by the taking of careful histories and the making of physical examinations is most valuable, but beyond this he gets little other training, and he more or less wastes his first year in the nonteaching private hospital. On the other hand, if he has had a year under adequate supervision, he may have acquired enough skill and judgment to inspire a measure of confidence in his staff surgeons. Of course, if he stays another year he will be still more valuable, but on account of the lack of teaching and the lack of real work to do he may become discontented, do his work poorly, and leave at the first opportunity to take what he thinks is a better position. We have concluded, and I believe it is generally agreed, that at least three years in a hospital are needed before a doctor acquires any sound knowledge of a patient's physiologic status. Such a term of service gives him a working knowledge of medicine and he is ready to begin practice as a fair assistant.

Now let us discuss the ordinary daily routine of the private hospital. Suppose we start with the patient who consults me at my office. He has been referred to me by one of the medical men with a diagnosis of chronic cholecystic disease. His physician has been looking after him for some time and has gone over him very carefully. All laboratory studies have been made, as well as x-rays. Or the patient may come to me primarily, complaining of certain

*Read in Section on Medical Education, Southern Medical Association, Thirty-Second Annual Meeting, Oklahoma City, Oklahoma, November 15-18, 1938.

symptoms. In that case we take his history, do a complete physical examination, laboratory tests and x-rays and finally arrive at a diagnosis of chronic cholecystitis. Often the case is referred to a competent internist for a medical check-up, and finally operation is advised. In any case the patient is put on preliminary treatment at home and is then sent to the hospital one or two days before operation. When he enters the hospital the intern takes the history and makes a physical examination for the hospital record. When the surgeon comes later to call on his patient the intern may be available to visit the patient with him or he may be out of reach for one of several reasons. He may be doing a dressing in another part of the building; he may be assisting at an operation; or he may be giving a parenteral solution; or making rounds with another doctor. Therefore, the surgeon sees his patient alone and writes his own preoperative orders. The morning of the operation may find two or more doctors with surgery schedules, and the intern or resident who has been assigned my case may or may not be free to help me. Granting that he can be present, the chances are that other operations follow and he must go on to another case immediately. My operation completed, I go by the patient's room, as well as the others in the house. If there is a resident free he may go with me, but at least half the time they are still busy in the surgery, so I make my rounds alone, do the dressings, and write all the orders. It is natural to conclude, then, that there is some justification in the lack of interest on the part of the surgeon in the teaching of the house officers.

In the hospital where I do most of my private work, an institution of 135 beds, we have at present only three residents. We are supposed to have four, but one left to go into practice because he felt that he was getting insufficient training. When I make my late afternoon visits one of them may be out, one may be in the accident ward, and the other examining a new patient, and as I do not wish to interrupt their routine work, I again must see my patients alone.

The time element has much to do with the failure of the staff to give the instruction that they would like to give. I always have patients in three hospitals, sometimes four, all of whom expect me to visit them once or twice daily, and when I do this there is little time left for instruction to house officers. Even if I had more time the resident would not be consistently available to relieve me of enough work to make time for me to instruct him. Of course, there are numerous routine duties, many of which need not be elaborated here, which occupy the house physician's time. Beyond this he can be of little individual assistance to the visiting surgeon.

I find that private patients in the South demand much more time from their doctors than corresponding classes of people in other sections. They are not satisfied unless he makes frequent trips to their bedside, and most of them expect him to do the dressings himself. I feel that in most cases he should do the latter because many of our residents do not recognize an early wound infection or the collection of serum in its beginning.

In the operating room we find that first-year men make poor first assistants. Second- or third-year men are better, but they are often handicapped by having to assist a large number of surgeons, each employing different technics. Thus he does not develop into a first-class assistant and this difficulty has led many surgeons to employ their own private assistant, who of course serves as first assistant, leaving the resident as second, or not using him at all. The resident as a rule thinks he is too good to act as second assistant and does not care to be present unless the case is particularly interesting. Also, if he does not assist he is rather loathe to give the patient attention postoperatively.

I have found it necessary, even though we use residents who have had previous internship, to take complete charge of the postoperative care of all my patients. Certain little things of course can be left to the resident, but they come to us, as stated above, knowing little or nothing about postoperative care, such as when to use the stomach tube and to institute suction drainage, when to start fluids by mouth, when to increase the diet, when the wound should be dressed, when the sutures should be removed, and when to get the patient out of bed. Not only are they deficient in the above mentioned things, but until they have had several years' work they very often misjudge the patient's physiologic status. Sometimes I am told that the patient is doing well, but as soon as I see him I realize that something is wrong.

In my criticism of the private hospital as a teaching medium in medicine I must, in justice, add that there are many valuable things outside the actual science of medicine which can be learned only in private hospitals. First, a doc-

tor dealing with a private patient paying for his services has to use an entirely different approach from that used in charity institutions. There is no justification for this difference of attitude, but it exists, and the doctor who plans to do private practice needs to acquire a pleasant, reassuring bedside manner.

The training in the private hospital is of great value to a young doctor when he starts out in practice. The young men who have had only training in a charity institution sometimes have found great difficulty in handling private patients. As a rule, it seems to me there is less delay in the diagnostic study in the private hospital than in the teaching institution. One has to consider the expense to the patient, and members of the family are in closer touch with the surgeon. They are at the hospital waiting for his visits and are anxious to know the condition of the patient, what is going to be done, and when it is to be done. It is also my feeling that the practicing surgeon is less apt to follow a certain routine than is the teaching surgeon, and that each case is more of an individual problem of what is best to be done for this particular patient. In other words, the patient is less apt to fall into a "series" of any certain procedure that may be abandoned after a certain number of cases have been done. I also think, but I may be mistaken, that the practicing surgeon pays more attention than does the teaching surgeon to the little things that add to the patient's comfort. Likewise, other elements enter into private practice. The private physician often has among his clientele his personal friends, relatives, or persons on whom his reputation may depend. These are, again, things that should not need elaborating, but must be considered in a survey of things medical. An intelligent patient wants to discuss his disorders with his doctor and the ability to do this satisfactorily is by no means a small accomplishment. So therefore in spite of the fact that the practicing surgeon has not the time to devote to the teaching of interns, they do acquire something that they do not get in the teaching hospital. Another advantage that training in a private hospital offers is that the intern or resident has more of an opportunity to study certain diseases in their early stages. Cancer patients, I would say, as a rule are seen earlier in the private institution than in the charity or institutional hospitals. Several years ago Dr. Mont R. Reid reported an unusually high percentage of five- and ten-year cures of cancer of the breast among his private patients, while in the Cincinnati General Hospital, of which he was Surgeon-in-Chief, there were practically no cures. Private patients with appendicitis as a rule are seen and operated upon earlier in private institutions than patients in charity hospitals. Complications resulting from surgical delay, of course, are more common in the teaching hospital than the private hospital; and the resident in the private hospital may be handicapped by not having seen enough of these various complications that occur postoperatively.

Going back to my own internship 28 years ago, I do not suppose conditions have changed very much except, of course, for the marked advance in medical science. My internship and residency were in a teaching hospital with both institutional and private patients. I had finished at one of the better medical schools and had been a fair average student. I felt then, and feel now, that I had been taught an appreciation of the finer things in medicine and, in so far as possible, the proper outlook toward medicine and surgery and the patient's welfare. I had learned some theory, but very little of the practical application of it, particularly surgery.

If I had one criticism to make of medical schools at the present time and of the teaching of interns, I would say that the students leave the medical schools and the young doctors leave the hospitals knowing too little of the commoner ailments that they run into on beginning practice. Unless a young surgeon has had splendid training and begins his work as a finished surgeon, his first patients are those afflicted with the commoner ailments. If he does not know how to handle these, then his patients soon lose confidence in him. Young physicians seem to know much more of the rarer, more complicated, more serious diseases than they do of a furuncle, a localized infection, a caruncle, an infected finger, or an ingrowing toenail, and the handling of simple wounds. Most of them do not know how to do a careful dressing which is comfortable and which will stay in place. Their aseptic technic is very good, but they do not handle tissues and dressings as gently as they should and they rely too much on the importance of germicidal solutions.

I think in medical schools and in the hospitals they should be taught more of anesthesia. At the present time most private hospitals are employing nurse anesthetists, who to my mind are not quite satisfactory. It seems to me that the

anesthesia at my disposal has never been quite up to standard. We should have more physician-anesthetists capable of the administration of all forms of anesthesia, using whatever anesthesia is best for that particular patient and for that particular operation.

The four-year medical course can give only so much, and I feel that in medical school, theory is more important than practice, and that the internship and residency serve to teach the young surgeon the practical application of the principles he has been taught. The teaching of the interns and residents in private hospitals has been neglected by the practicing physician and surgeon and if we expect to get the assistance that we should have from the house officers then we must reorganize in such a way that we can do more teaching and give the interns and residents better training.

DISCUSSION (*Abstract*)

Symposium on Medical Education, Papers of Dr. Barker, Dr. Kirkham and Dr. Ledbetter.

Dr. Robt. U. Patterson, Oklahoma City, Okla.—Every student, before being admitted to the medical school, should have more than a perfunctory physical examination. The average certificates presented from physicians that applicants are in good condition often are not worth the paper on which they are written, as they are often not based upon actual physical examination. They are either very cursory or a report is rendered as a result of friendly knowledge of the applicant. At the University of Oklahoma School of Medicine, a full day is devoted to a careful physical examination of all freshmen by a group of eight or nine members of the faculty. Remedial defects are followed up for correction. Those found to have serious disabling conditions physically are rejected.

In spite of the crowded curriculum of all medical schools, some regular time each week during the school term should be left available for some form of athletic diversion.

It is most important that medical students in addition to the requirements with respect to chemistry, physics and other biological sciences should be encouraged to take as much study of a cultural nature as possible. Ordinarily the best physicians are those who have had the best general education which helps them in their contacts with patients and in understanding the problems that come up in the different social groups.

Statistics gathered over a period of years by the Association of American Medical Colleges indicate that students who have an A.B. degree as a rule seem to do better in the medical school than those with a B.S., that those with a general cultural education seem to make the most progress.

The time has now definitely arrived when authorities of all hospitals should realize their absolute obligation to continue the education of interns and residents by definite programs and continuous supervision by all members of the professional staff of a hospital, including the medical superintendent. This is particularly to be emphasized in teaching hospitals. With the hospital requirements laid down by the various national boards of the specialists, now it is more than ever a duty and definite responsibility of all well organized hospitals to provide the necessary guidance, instruction, and the internships and residencies which will make it possible for a large number of medical students to complete the minimum requirements of the specialty boards.

The Section on Medical Education as set up at the present time has a rather limited field. Medical directors, medical superintendents and members of the teaching and visiting staffs of hospitals should be invited to take an active part in the Section since medical education, beginning with the student, must now be carried on definitely through the hospital years comprising internships and residencies.

Dr. F. R. Bradley, St. Louis, Mo.—If we concede that science is the basis of medical progress, and we do concede that, then clinical instruction must be closely interwoven with training in basic sciences. In the hospital, the basic sciences should, it seems, be best taught by men who are also clinicians. This is especially true of the specialists.

Dr. Ledbetter, in his paper, touched upon the weaknesses of internship training in detail and it is the obligation of the hospitals of today, the nonteaching as well as the teaching hospitals, to correct these shortcomings. Better training must be provided for the intern.

The care of the sick and injured is the primary function of the hospital, but the hospital superintendent should appreciate and further the needs of medical science and education. The plea for scientific and educational uses of the hospital would not be justified if it could be shown that such uses interfere with the patients welfare. It has been definitely shown through the years, based on long experience, that the interests of the patients are best served in hospitals which likewise recognize fully the need of medical education and scientific method. The hospital serves the community more broadly and effectively if it does not limit its activities merely to the care of patients.

The chief educational task of the hospital will always be the teaching of the clinical subjects. Until 1898, beginning with the Johns Hopkins, hospital and medical schools developed independently of each other and some time was necessary to bring them together in close affiliation. Now all medical schools, if they have not hospitals of their own, have established affiliations between municipal or voluntary hospitals whereby the ward patients of those hospitals are available for clinical material for the training of students and interns, nurses, social workers, dietitians, anesthetists, and so on.

In the training of surgeons, the requirements of the American Board of Surgery, which held its first examinations this year, by the cooperation of the thirteen surgical societies, including the Southern Surgical Association, will raise the standards of men who intend to take up surgery as a career. There is reason to hope that the standards of hospitals will also be raised so that more and more hospitals will be prepared to furnish this special training in surgery of not less than five years. One of the first requirements of this training is that it be supplemented by sufficient experience in the basic sciences definitely to assure the turning out of a well-trained man.

Dr. Kirkham has pointed out that "the preclinical sciences are the basis and foundation of all medical practice." That this is true is being recognized, not only by the American Board of Surgery, but by the various specialties, specifically otolaryngology and ophthalmology. Let us describe just the course in otolaryngology. Basic science courses are given in anatomy, physiology, bacteriology, histology, pathology, embryology, pertaining to the nose, throat, bronchi, ear, brain and autonomic nervous system. As an illustration of how comprehensive the study is, physiology is taught in its several aspects; physiology, clinical physiology and neurophysiology.

In conclusion, the fountainhead of scientific progress lies in the educational system and if that system is neglected, we suffer. The most favorable environment for productive research is the university, and hospitals which are affiliated with medical schools undoubtedly offer the best opportunities for the development of medical progress. There is no doubt that medicine will play a leading part in the solution of many sociological problems, as well as medical and scientific, and there is a definite need for the closest cooperation between the physician, the medical school, and the hospitals.

The close cooperation which is now taking place between the American Medical Association, the American College of Surgeons, the American Hospital Association, and the American College of Hospital Administrators brings forth the thought that perhaps it might be the proper time for the Southern Medical Association to create a Section on Hospitals. In the creation of such a section cooperation between the hospital superintendent and the practitioner can be brought about. On the part of the hospital administrator, this section would enable him to become better versed in the scientific aspect of medicine and enable him better to coordinate the many complex activities of the hospital which have to do with the care of the patients. It seems advisable because of the small size of this section to combine it with the Section on Medical Education. After discussing this idea with General Patterson, I should like to read the following resolution which he prepared:

WHEREAS, The medical profession is coming to realize more and more that the responsibility for proper medical education does not cease with the graduation of a student from the medical school; and,

WHEREAS, There exists a greater need than ever to train students of medicine more thoroughly in the basic medical sciences and their direct application to the clinical and medical sciences; and,

WHEREAS, It appears definitely to be the duty of all hospitals, particularly teaching hospitals, to provide through their administrative and visiting staffs a direct, continuous and thorough supervision and instruction of interns and residents; and,

WHEREAS, Such a program can only be carried on successfully with the full cooperation of the administrative and clinical staffs of hospitals; and,

WHEREAS, It appears more necessary than ever before that physicians who are administering hospitals should play a large part in the medical educational system involved in the training of medical students, interns and residents,

BE IT RESOLVED, That the Section on Medical Education recommends to the Council of the Southern Medical Association the changing of the name of the Section on Medical Education to Section on Medical Education and Hospital Administration and Training, with the usual officers and organization for proper functioning and that such a section be given a place on the program at future meetings of the Southern Medical Association.

Dr. O. S. Gibbs, Memphis, Tenn.—Mr. Chairman raised the question, which has provoked much discussion, of the playtime activities of medical students. Personally, I regard medicine as an intensely serious subject, but also full of most remarkable mental adventures, in consequence of which I cannot feel sorry for anyone privileged to be its student. Moreover, I am convinced that the old system of few playtime facilities produced medical men still unsurpassed in character, as, for example, such gentlemen as our very distinguished colleague now present, Dr. Barker, of Hopkins. Equally, I am convinced that not only does youth always find outlet for its lighter activities, but that fun when organized loses its joyous character. Nevertheless, there is a real problem in the overworked, frequently ill-nourished and always overtaxed student who is "putting himself through college." The learning of medicine is a physical strain, not lightened by the present day trend of condensation, and no student can fully profit by his educational opportunities if he must scatter a major part of his limited physical powers. Loaning money and so loading a student with debt is not a satisfactory answer to this difficult problem.

All the speakers who referred to this subject stated that medicine has its roots in science, and is based on the preclinical studies. This is the oft-repeated half-truth with which I firmly disagree. The only reason for the existence of medicine is the need of sick humanity. The advent of science has not changed the essential character of medicine one iota. Science, like all other branches of human knowledge, is in this case a servant and is not the master of medicine.

A speaker has deplored the absence of adequate psychologic training. So do I, but where can this be obtained? For while the subject remains largely a mass of empirical observations, complex, copious and often unsavory theories, mostly disconnected from what little is known of cerebral physiology, and taught by men and women who are fortunate if they have studied even an elementary course in physiology under a competent man, I am not convinced that its value is as great as the learning of the purely empirical art of gentle handling and of plain homely kindliness to the sick and frightened.

Most speakers and writers, both here, present and elsewhere, deplore the inadequate time allotted to the study of their subject. I will join with this majority and say that the applied branch of my own field, pharmacology, is almost universally poorly taught. I am personally always being attacked because of my failure to teach the students "at least to write a decent prescription." I do not, and under the present conditions I never shall! To write a sound medical order requires not only knowledge of drug action and of differential diagnosis, but of the needs of a sick individual. The former, I teach; the second, my students have as yet no knowledge of, and the third and most important factor is utterly missing. Writing good medical orders, giving them, or carrying them out is the goal of medical education and there are most emphatically no short cuts. The learning (such as I did myself) of old-fashioned gibberish; invocations to Osiris and Jupiter; and the issuing of inane instructions such as "misce ut fiat mistura" to a trained pharmacist are all pieces of medical history and have little place in an overcrowded medical curriculum. The appointment of trained pharmacologists to hospitals as clinical pharmacologists, much in the present status of a clinical pathologist, would go

a long way to solve the difficult present day problem of the intelligent use of drugs. Without such clinical or applied training, much of our basal pharmacology is utterly wasted since the students later on tend to learn ready-made prescriptions which are as likely to be useless as useful in any given case.

To those who venture to criticize any of us teachers, may I say, bluntly that medicine as well as medical education is on a price basis. It is true that wonderful buildings are springing up. Even we are indulging to the tune of $166,000.00 for a student dormitory. Working budgets, on which the operation of all schools depend, are not now, gentlemen, cut to the bone; they are right inside the medullary canal. Until those in authority appreciate that the same business rules operate in education as elsewhere, namely, you get what you pay for, we shall not in most schools be able to give either the quality or the quantity of educational facilities, even within the capabilities of our present inadequate staffs, that we could otherwise accomplish. I have personally visited many schools, and I have ceased to be saddened and distressed to find scientific departments purporting to be of the university type, barely able to give good instruction of those things well known, and largely unable even to commence the task of teaching the students to use the instruments of the near future. When budgets include, as they must if they are in any other business, a proper sum for depreciation as well as a sum for the barest supplies, this rather pitiful situation will be greatly relieved. There is no doubt that the greatest need in medical education today is money for the purchase of men and materials, and sometimes for buildings.

Finally, may I say that I regard the dissatisfaction expressed by all and sundry with their curricula, facilities, and even results, as an entirely healthy matter and as a happy augury for the future of medicine.

Dr. Harry C. Schmeisser, Memphis, Tenn.—At the University of Tennessee the medical student is trained in the art of quickly gathering literature on a given subject at the time he prepares his thesis, which must be approved by a member of the preclinical faculty before he is permitted to take the comprehensive examination. The comprehensive examination given by the clinical faculty covering all of the preclinical sciences assures a satisfactory training in these subjects before our students are permitted to enter upon the study of the clinical sciences. We carry the preclinical sciences into the internship by having the professors of anatomy, biochemistry, physiology and pharmacology as consultants to the University hospital.

Dr. Ledbetter (closing).—It was not my intention to criticize the private hospital in a scathing manner, but to express my feelings on the disadvantages of the private hospital in the training of young physicians. They can learn much in the private hospital if the visiting staff will take the time to instruct them, but unfortunately in most instances they are not inclined to do so. The training of the intern is far better in the teaching hospital than it is in the private hospital. If he has had previous training in the teaching hospital and comes to the private hospital as a resident after he has learned some of the fundamentals, then his time is less apt to be wasted; and he is also of greater assistance to the visiting staff.

The situation could be improved a great deal if the staff members would take more interest in the teaching of the intern. For a number of years I used a private assistant, but for the past year have been without one, during which time I have made a special effort to have one of the residents with me at all times and have tried to give them as much instruction as possible. I am happy to say that I have been well rewarded for the time given. They have been more interested and have done better work and my patients have had much better care.

Southern Medical Journal

JOURNAL OF THE

SOUTHERN MEDICAL ASSOCIATION

Copyright, Southern Medical Association, 1939. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription $4.00. Single copies, 35c each.

Entered as second-class matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

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Volume 32 SEPTEMBER 1939 Number 9

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-Third Annual Meeting
Memphis, Tennessee, November 21-24, 1939

ADVERTISING AND THE PUBLIC

Nearly thirty years ago, the Council on Pharmacy and Chemistry of the American Medical Association published analyses of Listerine, with the conclusion that five cents' worth of antiseptic was being delivered for one dollar. This apparently had no adverse effect on the sale of the drug or of the stock of its manufacturers. The company's business has prospered greatly since, due largely to an intensive advertising campaign, which is now, however, being legally regulated by the activities of the Federal Trade Commission. The Lamberth Company has been ordered to cease and desist from misleading statements in its advertisements to the effect that dandruff is caused by Pityrosporon ovale, or cured by Listerine. Halitosis is not mentioned in the most recently available report of the Commission.

The Commission has ordered the ZO-RO-LO Company of Ada, Ohio, to discontinue misrepresentations to the effect that zo-ro-lo cures arthritis, asthma, brain disease, Bright's disease, diabetes, epilepsy, sinus, kidney, or prostate gland trouble, starts one on the road to health or builds up resistance or is anything but a laxative or purgative.

It forbids advertisements of Benaris as a cure for colds, hay fever, headaches, and so on.

It forbids the sale of Fema-Lade and other commodities for women's ills as having possible serious consequences. It forbids the Miles Laboratories from saying in advertisements that colds, neuralgia and indigestion result from acid in the system and that Alka-Seltzer corrects these.

Other medicaments under investigation for misrepresentation in advertisements include Hagen's blood purifying tea, Balsam Breath Filter Inhaler, Lewellyn's pure wheat germ, Palmer's skin success ointment, Shank's Mange lotion, Planter's Benedicta tablets, No-no-germ control, ostrex, Vit-o-net, an electrical blanket for treating diseases; Quick Death: all rodents who eat it will go outside buildings to die; and staminakel-pep, or Spanish passion extract.

HF has agreed to cease representing that its product is the world's most famous athlete's foot medicine, or that it has spent more money for advertising in a given time than any other vendor of athlete's foot medicine.

According to Adolf Hitler, by the judicious use of propaganda a people can be convinced that heaven itself is hell.

The Federal Trade Commission is continuing its efforts to protect the public against misleading advertisements, which are of course paid propaganda. It is particularly active just now in the field of medicaments. Its principles depend upon current knowledge of the medical profession, which must in the end say what claims are permissible for any remedy, and from this standpoint its work will be closely followed by physicians.

INFANT STOMACH FUNCTION

One thinks of achlorhydria gastrica as a defect of middle age, or at least of adult life. Absence of free hydrochloric acid in the stomach content usually exists for years before the onset of pernicious anemia; and it is rare that this disease occurs in persons under thirty. Bloomfield and Polland have shown that secretion of hydrochloric acid tends to diminish with advancing years.

Hydrochloric acid is readily determined in the stomach content of adults. The essential

digestive enzymes and the intrinsic factor or factors are difficult to determine, and rarely are determined, but it is rather to be believed that they also diminish or are absent when hydrochloric acid secretion is low. As a working hypothesis one may consider the amount of hydrochloric acid in the gastric juice as an indicator of its digestive efficiency.

Infants also may suffer from absence of hydrochloric acid in the stomach juice. According to Wilson,[1] of Vancouver, this is often associated with an hypochromic anemia. Wilson reports a series of twelve anemic children, with greatly diminished or no hydrochloric acid. Their ages ranged from 10 months to 10 years. Three-fourths of them had been receiving a deficient diet, which was perhaps causative of the anemia. Either breast feeding had been unduly prolonged, or meat and green vegetables had been added late to the menu.

It was attempted to treat the anemia by administration of hydrochloric acid. This did not stimulate the reticulocyte count or improve the blood picture. Administration of iron brought about prompt reticulocytosis, and eventually restoration of the blood picture to normal, with reappearance of hydrochloric acid in the gastric juice. It is exceedingly interesting that improvement of the blood picture by treatment with iron brought about a return to normal of the acid secretion, and one might not illogically infer that such unknowns as the intrinsic factor or certain gastric enzymes were also lowered during the anemia and benefited by its correction. The interrelation of red cell function and stomach secretion at these ages is worthy of attention. It has not been reported that achlorhydria gastrica of adults is benefited by iron treatment.

Decreased acid in the stomach juice, of course, should diminish absorption and assimilation of necessary foods, and since the bactericidal action of the juice is lowered, should also increase the liability to gastro-intestinal infection as well as to other digestive disturbances.

Half the women who are delivered on clinic services of large hospitals are probably suffering from a considerable degree of anemia, and for this reason anemia of their newborn is very much to be expected. Little attention is paid to the blood count of young infants, since anemia is not a painful or acute condition, does not cause the infant to choke or even to cry.

Possibly iron should be administered to the newborn offspring of anemic mothers as a routine, because milk is notoriously deficient in this element with which the infant should be abundantly supplied. At least the matter should be investigated.

1. Wilson, Reginald: Relation of Achlorhydria to the Nutritional Anemias of Children. Canadian Med. Assn. Jour., **41**: 170 (Aug.) 1939.

SALT AND WEIGHT MAINTENANCE

The current idea that all fat persons overeat, and that reduction of an individual's weight is merely a matter of reducing his food intake, is still that popularized twenty-five years ago in an entertaining small book written by a woman doctor, "Diet and Health with a Key to the Calories." It was to the effect that a pat of butter or a piece of bread invariably produced a certain amount of heat or fat.

Actually the maintenance of a rather constant weight by fat or thin persons, who may ingest or excrete several pounds of fluid and solid matter daily is as complex an achievement as the maintenance of a constant temperature and constant hydrogen ion concentration in the blood; and these are only momentarily influenced by the food intake.

Current studies on Addison's disease throw light not only upon the nature and treatment of this not very common disease, but upon weight maintenance in health. Thorn, Howard and Emerson,[1] of Johns Hopkins University, who have treated a number of cases of adrenal cortical deficiency very successfully with a synthetic hormone, desoxycorticosterone, note that injection of this product produces weight gain in two to three days in the patient with Addison's disease, and its withdrawal is followed as rapidly by weight loss. As the patient increases in weight, sodium, chlorine and water are retained by him, while potassium is lost. There is a concomitant increase in the total plasma content of sodium and chlorine. When the adrenal hormone is withdrawn, there is a prompt diuresis and increased urinary excretion of sodium and chlorine. This is regardless of the intake of these minerals. The same metabolic effects may be obtained in normal persons by administration of desoxycorticosterone, with the

1. Thorn, G. W.; Howard, R. P.; and Emerson, Kendall, Jr.: Treatment of Addison's Disease with Desoxycorticosterone Acetate: A Synthetic Adrenal Cortical Hormone. Jour. Clin. Investig., **18**:449 (July) 1939.

difference that the patient with Addison's disease is symptomatically greatly improved by the drug, whereas the normal individual who takes it may feel quite uncomfortable.

A normal person may be made to gain weight temporarily by administration of a large amount of table salt. This also is doubtless a phenomenon of water retention.

In Addison's disease weight maintenance depends, then, not upon caloric intake, but much more directly upon mineral and water retention in the body. It may be assumed that certain individuals who remain thin in spite of eating more than the average number of calories, may have low adrenal function and may be unable to retain sufficient water and salt for proper hydration and maintenance of osmotic pressure in the tissues; and that some of the obese have a hyperfunction of the cortex, and hence gain weight on water. With fasting obese patients whose metabolism was studied in a hospital, it was observed that weight was lost as water. So far, it has not been reported that the patients with Addison's disease store a notable amount of fat after months of treatment.

Water is the most important single element in the body and makes up three-fourths of it.

Desoxycorticosterone may be added to the list of antidiuretics. Hypersecretion of the adrenal cortex is a possible cause of certain forms of edema, in which sodium chloride excretion is low and potassium excretion is high. There being no way at the moment of treating overactivity of the hormone, one might consider administration of potassium to cases of the latter type, with the idea that potassium is possibly antagonistic to secretion of adrenal cortical hormone.

TOXICITY OF DRUGS

Interesting chemicals are the synthetic products with hormone-like effects in the living body. Desoxycorticosterone was synthesized in Switzerland and was found capable of maintaining life in adrenalectomized animals before it was obtained from the adrenals. Soon after its synthesis an identical substance was crystallized from adrenal cortical tissue.

Vitamin D and the hormone of the parathyroid glands have some similar physiologic effects. Dihydrotachysterol is one of the products obtained by irradiation of ergosterol with ultraviolet light, by which method the antirachitic vitamin also is prepared. After oral ingestion, dihydrotachysterol acts like parathyroid hormone in the body, promptly elevating the blood calcium. According to MacBryde,[1] of St. Louis, it has many advantages over parathyroid extract in the treatment of chronic tetany; it relieves symptoms and maintains the blood calcium at a normal level.

Diethyl stilbestrol is a chemical with estrogenic effects in small animals. It was synthesized from non-living sources and was shown to act like the estrogenic hormone of the ovarian follicle, though it has an entirely different chemical structure. Clinical investigations suggest that it may be substituted for the estrogens in cases which are benefited by the follicle hormone. This may be advantageous, since it is active by mouth. It has not been put on the market, not yet having been licensed by the Federal Trade Commission, but its possible beneficial and toxic effects are under investigation.

Selye,[2] of McGill University, has undertaken a quantitative comparison of the toxicity of diethyl stilbestrol and that of the follicle hormone. Using male and female mice, he arranged groupings and controls to compare equivalent quantities of these two stimulants. The dosage was quite large. A group of male mice received 1 milligram of each product in oil daily subcutaneously over a thirteen-day period. Another group received 5 milligrams per week in a single dose. In the group of males which received 1 milligram of diethyl stilbestrol daily, one-third died before the end of the two-week period. None of the estrone-treated died. The surviving diethyl stilbestrol-treated showed marked icterus, and at autopsy necrosis and leukocytic infiltration of the liver. The estrone-treated were killed and examined. Only one showed icterus, and no liver lesions were detected.

In another strain of mice which received the same treatment, three-fourths of the diethyl stilbestrol-treated died, and only one-eighth of the estrone-treated. A group of female mice was apparently still more susceptible than the males to both drugs. With a smaller dosage, all the stilbestrol-treated died, but less than half the estradiol-treated. Autopsy of both stilbestrol and estrone groups disclosed stomach ulcers, adrenal

1. MacBryde, Cyril: The Treatment of Hypoparathyroidism with Dihydrotachysterol. Sou. Med. Jour., **31**:720, 1938.

2. Selye, Hans: On the Toxicity of Oestrogens, with Special Reference to Diethyl Stilboestrol. Canad. Med. Assn. Jour., **41**:48 (July) 1939.

cortical hyperplasia, pyometra and hepatitis. Hydronephrosis occurred in several cases as a result of obstruction in the urinary passages. All changes were more marked in the stilbestrol groups.

All drugs are toxic if taken in sufficient quantity, and the naturally occurring estrogens are not exceptions. Under certain circumstances the toxic effects are exaggerated. Theelin, for example, is particularly toxic for adrenalectomized or hypophysectomized animals. This is in contrast with the effect of corpus luteum hormone, which aids in prolonging life in adrenalectomized animals. These facts may provide a clue to the explanation of the well-known facts of individual idiosyncrasy and variation in susceptibility to most drugs.

Early symptoms of toxicity of either theelin or diethyl stilbestrol are jaundice and signs of liver injury.

Since the latter drug is active by mouth, and is more toxic than the estrogenic tissue extracts, likelihood of overdosage with it, if it is marketed, is greater than with drugs given hypodermatically. If it is prescribed, as theelin is, over somewhat indefinite periods for women who are passing through or have passed through the menopause, chronic reactions of long-continued administration are to be looked for. According to Selye, its injurious effects are like those of theelin, but weight for weight it is more harmful. It is to be hoped that patients will not take it like a tonic, but will be repeatedly studied by the physician while they are being treated with it.

Selye's work on its toxicity to some extent confirms the similarity of its clinical effects to those of theelin. In high dosage its harmful effects were very much the same, though greater in degree.

TWENTY-FIVE YEARS AGO

From Journals of 1914

EARLY WEEKS OF THE WORLD WAR

Scientists and War.[1]—The animosity against this country [England] so violently expressed in the German lay press is reflected in the medical journals * * * reference was made to the amazing 'declaration by German professors and men of science' * * * bearing the signatures among many others of von Behring, Paul Ehrlich, Czerny, August Bier, Haeckel and Wilhelm Wundt.

Wounded on Battlefield.[2]—All the preparations of the French Medical Service with regard to the organization of ambulance work and attendance on the wounded have been upset by the unforeseeable methods of the enemy in systematically firing on ambulances, killing medical officers and nurses, and abandoning the wounded on the field of battle.

Wound Infection.[3]—The majority of the public * * * has but a very slight idea of the nature of the wounds that are being received in this war. Some of the wounds * * * a majority * * * are of an incredible severity * * * they are infected from the beginning. Ordinary pus organisms seem to be, initially at any rate, prevented from gaining any foothold by the extraordinary quantity of anaerobic organisms such as the tetanus bacillus, Bacillus aerogenes capsulatus, and bacillus of malignant edema. The soil of France, as also that of Belgium, has been thoroughly and steadily manured for an untold number of years. * * * In trenches dug out of this soil the men stand for hours and get their clothing and hands caked with mud.

First Dressing of Wounds.[4]—Tuffier concludes that antisepsis is incontestably superior to asepsis. Aseptic gauze and sterilized water are broken reeds to trust to as compared with a trustworthy antiseptic dressing and carbolic acid, by preference pure, for the first purification of a wound which is possibly infected with the organisms of tetanus or spreading gangrene. * * * In Lister's early compound fracture cases, the wounds were treated rather freely with undiluted carbolic acid without any evil results following.

Early Treatment of Wounds.[5]—Your correspondent refers to motor ambulances * * * it is not creditable to the nation that private subscription should have been set up in order to provide such absolutely essential means of transport of our wounded. Indeed, it is stated that an offer to the War Office of such motor ambulances was originally refused. * * * In the first weeks * * * the transport was chiefly by trains which took days to reach the coast, and here again, in consequence of undermanning in both the medical and nursing staff, a great deal of unnecessary suffering and loss of life has occurred. * * *

As though the conditions surrounding wounds in the present campaign were not sufficiently complicated, there has now been shown to me a memorandum purporting to be issued by the War Office prepared by Sir Rickman J. Godlee, Bart., in which the terrible proposal is made to swab out recent wounds with pure liquid carbolic acid!

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1. Editorial. German Professors and British Honours. Brit. Med. Jour., **2**:927, 1914.

2. Paris Correspondent. Lancet, **187**:115, 1914.

3. Special Correspondent: Medical Arrangements for British Expeditionary Force. Brit. Med. Jour., **2**:804, 1914.

4. Godlee, R. J.: Correspondence. Brit. Med. Jour., **2**:813, 1914.

5. Horsley, Victor: Care of the Wounded. Correspondence Brit. Med. Jour., **2**:813, 1914.

Officers

OFFICERS 1938-1939

The following is a complete roster of the officers of the Southern Medical Association for 1938-1939, and of associations meeting conjointly with the Southern Medical Association:

President—Dr. Walter E. Vest, Huntington, West Virginia.

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American Public Health Association, Southern Branch (meeting conjointly with Southern Medical Association)—Dr. J. N. Baker, President, Montgomery, Alabama; Dr. W. B. Grayson, First Vice-President, Little Rock, Arkansas; Mr. V. M. Ehlers, Second Vice-President, Austin, Texas; Miss Donna Pearce, Third Vice-President, New Orleans, Louisiana; Dr. P. E. Blackerby, Secretary-Treasurer, Louisville, Kentucky.

National Malaria Committee (meeting conjointly with Southern Medical Association)—Dr. L. O. Howard, Honorary Chairman, Washington, D. C.; Mr. L. M. Clarkson, Chairman, Atlanta, Georgia; Mr. W. G. Stromquist, Chairman-Elect, Chattanooga, Tennessee; Dr. L. T. Coggeshall, Vice-Chairman, New York, New York; Dr. Mark F. Boyd, Secretary-Treasurer, Tallahassee, Florida.

American Society of Tropical Medicine (meeting conjointly with Southern Medical Association)—Dr. Alfred C. Reed, President, San Francisco, California; Dr. L. L. Williams, Jr., President-Elect, Washington, D. C.; Dr. S. S. Cook, Vice-President, Norfolk, Virginia; Dr. E. Harold Hinman, Secretary-Treasurer, Wilson Dam, Alabama; Dr. Charles F. Craig, Editor, San Antonio, Texas.

Southern Association of Anesthetists (meeting conjointly with Southern Medical Association)—Dr. R. F. Bonham, President, Houston, Texas; Dr. T. L. Tidmore, President-Elect, Atlanta, Georgia; Dr. R. D. Sanders, Vice-President, Louisville, Kentucky; Dr. Dougal M. Dollar, Secretary-Treasurer, Louisville, Kentucky.

Women Physicians of the Southern Medical Association—Dr. Margaret Mary Nicholson, Chairman, Washington, D. C.; Dr. Leila E. Andrews, Vice-Chairman, Oklahoma City, Oklahoma; Dr. Nina Fay Calhoun, Secretary, Dallas, Texas.

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Book Reviews

Surgery of the Eye. By Meyer Wiener, M.D., Professor of Clinical Ophthalmology, Washington University School of Medicine, St. Louis, and Bennett Y. Alvis, M.D., Assistant Professor of Clinical Ophthalmology, Washington University School of Medicine, St. Louis. 445 pages, illustrated. Philadelphia: W. B. Saunders Company, 1939. Cloth $8.50.

If one could possibly learn operative technic from excellent and satisfactory illustrations, this volume would certainly answer his need.

There are almost as many illustrations as pages and many are new, fresh and vivid. One is glad to find the authors advising, with decision, what they prefer, and the pages are not unduly cluttered up with minor operative ideas of numerous other surgeons.

The various measures are clearly described and the young surgeon just beginning his operative life can wisely consult these pages. Even the older one can find an occasional wrinkle that will prove helpful.

Manual of the Diseases of the Eye: For Students and General Practitioners. By Charles H. May, M.D., Consulting Ophthalmologist to Bellevue, Mt. Sinai and French Hospitals, New York, and Director of the Eye Service at Bellevue Hospital, New York. Sixteenth Edition, Revised with the Assistance of Charles A. Perera, M.D., Instructor in Ophthalmology, College of Physicians and Surgeons, Medical Department of Columbia University, New York. 515 pages, illustrated. Baltimore: William Wood & Co., 1939. Cloth $4.00.

Since its first appearance this volume on the subject has been the most popular textbook for medical students. It is still called a manual, but one is surprised to see how well the authors cover the smallest details of diagnosis and treatment. The illustrations are sufficient. The coloring of the plates is most excellent.

It is written for students and general physicians, but if one masters the subject as given in this book, he could readily qualify before any board, so far as theory is required. The book was good in 1900 and this sixteenth edition is easily the best of all.

Diseases of the Nose and Throat. By Charles J. Imperatori, M.D., F.A.C.S., Professor of Otolaryngology, New York Polyclinic Medical School and Hospital; and Herman J. Burman, M.D., F.A.C.S, Adjunct Professor of Otolaryngology, New York Polyclinic Medical School and Hospital, New York. Second Edition. 726 pages, illustrated. Philadelphia: J. B. Lippincott Company, 1939. Cloth $7.00.

This is an unusually satisfactory textbook. The use of larger print and the contrast of blacker type add to the pleasure of reading it.

The illustrations are abundant and meet every demand. The index is adequate. The most satisfactory feature is probably the clear, concise advice with reference to treatment.

Rather than long paragraphs of what this or that writer has advised, the authors give definite advice from their own extensive experience.

Surgical Anatomy. By C. Latimer Callander, A.B., M.D., F.A.C.S., Associate Clinical Professor of Surgery and Topographic Anatomy, University of California Medical School. With a foreword by Dean Lewis, M.D., Sc.D., LL.D., F.A.C.S. Second Edition. 857 pages, illustrated. Philadelphia: W. B. Saunders Company, 1939. Cloth $10.00.

The first edition of Callender's "Surgical Anatomy" was so well received in 1933 that the second edition, revised, rearranged and, in many sections, rewritten to include the most recent advances in the surgical anatomy of many topographical regions, has come off the press in 1939.

The author has endeavored to carry correct anatomical detail not only into the paths of surgical approach, but also into his depiction of the steps of the standardized commoner operations. In his arrangement of the subject matter the author discusses usually first the anatomical consideration, then the surgical.

For discussion the body is considered originally as follows: head; neck; thorax; abdomen; pelvis; male perineum and external genitals; female perineum and external genitals; vertebral column, canal and spinal cord; upper extremities; lower extremities. In each region, anatomical description and surgical application are well illustrated. Many old and out-of-date illustrations have been deleted and more than 100 new cuts have been added.

Of the more recent surgical advances which the book includes, special mention should be made of the sections dealing with lumbar sympathetic ganglionectomy, resection of the sacral plexus, scalenus anticus and cervical rib syndromes, and surgery of the intervertebral discs.

An interesting feature is the description of Callender's tendoplastic amputation through the femur at the knee. This operation has been well received since the author devised it and published his description of it in 1935.

A Descriptive Atlas of Radiographs: An Aid to Modern Clinical Methods. By A. P. Bertwistle, M.B., Ch.B., F.R.C.S., Ed. Fourth Edition. 576 pages, illustrated. St. Louis: The C. V. Mosby Company, 1939.

The object of this book, according to the author, is to show the immense possibilities of x-ray and that it is written for clinicians and not radiologists. He emphasizes the fact that the general practitioner should be very careful about selecting the cases in which x-ray examinations are indicated and thus eliminate much criticism of one of the most accurate methods of diagnosis.

The section of the book entitled "Milestones in Radio-Diagnosis" presents a complete review of the development and progress in this department of medicine. It is brief, thorough and well written. The author stresses the silhouette of soft tissues on his films and gives notes of the description of the photographs and drawings. The section on the cardiovascular system is incomplete since there is no method of appraising its size or shape.

This book can be used in teaching; but cannot be recommended as a reference because of its limited material. The printing, photographs and drawings are well done.

Positioning in Radiography. By K. C. Clark, Honorary Fellow and Past President, Society of Radiographers, Guy's Hospital Training Certificate, 1921. Radiographer-in Charge, Ilford Limited Radiographic Technical and Demonstration Department. 482 pages, illustrated. St. Louis: The C. V. Mosby Company, 1939.

This book presents the essentials of radiographic technic. Correct positioning has been photographed and the films from the positions are included together with drawings and the average exposure factors. Both new and old anatomical nomenclatures are given. The book does not attempt to go into the interpretation of radiographs. There are 1,190 illustrations, all of which are clear. This book can be highly recommended for a radiological department.

Outline of Roentgen Diagnosis: An Orientation in the Basic Principles of Diagnosis by the Roentgen Method. By Leo G. Rigler, B.S., M.B., M.D., Professor of Radiology, University of Minnesota, Minneapolis, Minnesota. Atlas Edition by Jean E. Hirsch. 212 pages. Philadelphia: J. B. Lippincott Company, 1938. Cloth, $6.50.

This book is based upon lecture notes used by the author in many years of teaching. It presents elementary diagnostic methods in x-ray and uncommon conditions are intentionally omitted. The book is divided into eleven sections, the first being devoted to general principles of roentgen diagnosis and the others covering different systems of the body. Each section describes the normal and pathologic roentgen appearances; also the value and limitations of this diagnostic method. Attached is the pictorial atlas with 226 photographs of x-ray films and drawings of the normal and pathologic findings described in the text. The book is well made, free of technical errors, and attractive in appearance. It should prove of value to those studying x-ray, but cannot replace personal instruction in this branch of medicine.

The Vaginal Diaphragm: Its Fitting and Use in Contraceptive Technic. By Le Mon Clark, M.S., M.D., Chicago, Illinois, Author of "Sex Education" and "Emotional Adjustment in Marriage." 107 pages, illustrated. St. Louis: The C. V. Mosby Company, 1939. Cloth $2.00.

The author looks upon the vaginal diaphragm as a good method of contraception rather than the ideal. In its use certain instructions must be carried out in fitting the contraceptive barrier and the patient must be taught the technic. Consideration must be given to the anatomy of the parts, especially when there have been changes due to childbirth and trauma, the size of the diaphragm and the use of the jellies or cream. "The actual success of this method in private practice should be above 98 per cent. * * * It is not enough that the physician be willing to discuss the question. He must be willing to open the question for discussion." Caution is expressed that a couple should have children within the first three years of married life. Otherwise they may become so selfish in themselves as not to desire them. This book gives many valuable pointers and should be read by every physician doing this type of work.

A Woman Surgeon: The Life and Work of Rosalie Slaughter Morton. 399 pages. New York: Frederick A. Stokes Company. Cloth $3.00.

The picture presented by this autobiography is one of success in a chosen vocation and the desire and determination to better the status of the underprivileged. The chapters assigned to childhood and adolescence show great family affection and the author's unbreakable determination to enter the medical profession. Space given to medical training in school and postgraduate study shows her resolution to succeed in her vocation. In the sections dealing with her stay in the Orient she stresses the problems of the underprivileged, as well as medical problems in these regions.

Her service during the World War both in the United States and in Europe clearly shows the administrative and constructive mentality of the author; the same can be said of her postwar activities, outstanding examples being the foundation of the American Women's Hospital and the International Serbian Education Committee as well as her follow-up system to evaluate those trained by this organization.

A section is devoted to South Africa, where conditions needing correction, as observed by the author, are presented with possible plans of betterment.

Throughout the text mental as well as medical and surgical treatment is stressed and the author is as interested in public health and social betterment as in the treatment of individual patients.

The book can be recommended as an example of interest, hard work, and satisfaction in results achieved.

Southern Medical News

ALABAMA

Dr. Jeptha W. Dennis, Montgomery, has been appointed College Physician and Director of the Student Health Service at Alabama Polytechnic Institute, Auburn.

Dr. M. Y. Dabney, Birmingham, Editor of the SOUTHERN MEDICAL JOURNAL, was guest speaker before the Howard College chapter of Alpha Epsilon Delta, national premedical fraternity, recently.

Dr. John W. Chenault (col.), Director of Orthopedic Surgery at Tuskegee, will be in charge of the new center for infantile paralysis at Tuskegee Institute, to be established by the $161,350 grant from the National Foundation for Infantile Paralysis.

Dr. Leslie M. Bell, Dozier, and Miss Marion Willard, Andalusia, were married June 7.

Dr. William H. DeRamus, Selma, and Miss Eleanor Faye Miller, Jackson, Tennessee, were married June 17.

DEATHS

Dr. William Johnson Callaway, Florence, aged 60, died May 20 of chronic myocarditis.

Dr. John Nathan Norris, Northport, aged 64, died April 17 of myocarditis.

Dr. Alfred Burt Pickering, Maplesville, aged 52, died April 9 of heart disease.

Dr. Alfred Raymond Lozano, Montgomery, aged 34, died May 18 of carcinoma of the tongue.

Dr. Joseph E. Barton, Jasper, aged 68, died May 20 of cirrhosis of the liver.

Dr. Joseph M. B. Johnson, Birmingham, aged 81, died April 29.

ARKANSAS

Dr. W. C. Riggins has resigned his position as Director of the Ashley County Health Unit and has accepted a position as Resident at Sparks Memorial Hospital at Fort Smith.

Continued on page 34

DOCTOR! *You are invited to attend . . .*

THE OKLAHOMA CITY CLINICAL SOCIETY'S
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October 30, 31, November 1, 2, 1939

——— Sixteen Distinguished Guest Lecturers ———

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DR. EDGAR G. BALLENGER, Urology, Atlanta; Urologist, Crawford W. Long Memorial Hosp.; Consulting Urologist, Henry Grady Memorial Hosp.; Pres. Amer. Urological Association.

DR. LEWELLYS F. BARKER, Internal Med., Baltimore; Prof. Emeritus of Med., Johns Hopkins U.; Visiting Phys., Johns Hopkins Hospital.

DR. LOWELL S. GOIN, Roentgenology, Los Angeles; Consulting Radiologist, Los Angeles Board of Education; Radiologist, L. A. Orthopedic Hosp., Radiologist and Chairman of Exec. Board Queen of Angels Hosp.

DR. HARRY S. GRADLE, Ophthalmology, Chicago; Extramural Prof., Northwestern U.; Chief of Staff, Ill. Eye and Ear Infir.; Attending Oph. at Michael Reese Hosp., Chicago.

DR. JOHN A. KOLMER, Pathology, Philadelphia; Prof. of Med. Temple U.; Director of Research Institute of Cutaneous Med.; Physician to Temple U. Hosp.

DR. FRANK H. LAHEY, Surgery, Boston; Director of Lahey Clinic, Boston; Surgeon-in-chief, New Eng. Baptist Hosp.; Surgeon-in-chief, New Eng. Deaconess Hosp.

DR. JOE V. MEIGS, Gynecology, Boston; Instr. in Surg., Harvard Med. School; Visiting Surg., Mass. Gen. Hosp.; Surgeon, Pondville Hosp., Mass. Dept. Public Health.

DR. A. GRAEME MITCHELL, Pediatrics, Cincinnati; Prof. of Ped., Univ. of Cincinnati Col. of Med.; Director and Chief of Staff, Children's Hosp., Cincinnati.

DR. EMIL NOVAK, Endocrinology-Gynecology, Baltimore; Assoc. Prof. Gynecology, Johns Hopkins Med. Col.; Visiting Gyn., Bon Secours and St. Agnes Hosp.

DR. HOBART A. REIMANN, Internal Medicine, Philadelphia; Prof. of Med., Jefferson Med. College; Attending Physician, Jefferson Hospital.

DR. ERWIN R. SCHMIDT, Surgery, Madison; Prof. of Surg., Univ. of Wisconsin Med. School; Chief Surg., State of Wisconsin Gen. Hospital.

DR. HERMAN C. SCHUMM, Orthopedics, Milwaukee; Clin. Prof. and Director of Division of Orthopedic Surg., Marquette Univ.; Assoc. Prof. of Orthopedic Surg., Univ. of Wis.

DR. ROCK SLEYSTER, Psychiatry, Wauwatosa, Wis.; Board of Trustees, Marquette Univ.; Medical Director, Milwaukee Sanitarium; President of American Medical Association.

DR. MARION B. SULZBERGER, Dermatology, New York; Asst. Clin. Prof. of Der. and Syph., Skin and Cancer Unit of N. Y. PG Med. School and Hosp. of Columbia Univ.

DR. WILLIAM A. WAGNER, Otolaryngology, New Orleans; Asst. Prof. Otolaryn., Tulane Univ. School of Med.; Visiting Surg., Charity Hosp.; Visiting Surg., Eye, Ear, Nose and Throat Hosp.

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For further information apply to Assistant Dean, Courses for Graduates, Harvard Medical School, Boston, Massachusetts.

Continued from page 982

Dr. Jett Scott, Hot Springs National Park, has been appointed a First Lieutenant in the Medical Corps of the Arkansas National Guard.

Dr. J. W. Butts, Helena, has been elected surgeon of the Helena post of the American Legion.

Dr. G. L. Hardgrave and Dr. G. R. Siegel, both of Clarksville, have been elected Vice-President and Director, respectively, of the Clarksville Lions Club.

Dr. R. M. Eubanks, Little Rock, did special work at the Mayo Clinic during June.

Dr. L. L. Fatherree, formerly of Jonesboro, has recently been appointed Health Officer of Little Rock.

Dr. J. T. Altman, Jonesboro, has recently been elected a Director of the Jonesboro Rotary Club.

Dr. B. L. Moore, El Dorado, has been elected Vice-President of the El Dorado Lions Club.

Dr. E. E. Estes, Fordyce, has been made a Governor of the Fordyce Country Club.

Dr. J. B. Jameson, Camden, made the presentation address at the dedicatory exercises presenting the new Municipal Building to the City of Camden.

Dr. Ellery C. Gay, Little Rock, has been appointed Director of the Crippled Children's Division of the State Welfare Department.

The State Medical Board of the Arkansas Medical Society has elected the following officers: President, Dr. L. T. Evans, Batesville; Vice-President, Dr. D. L. Owens, Harrison; Secretary-Treasurer, Dr. D. E. White, El Dorado.

Dr. D. W. Dykstra, Morrilton, has been appointed to head the new division of Syphilis Control of the Arkansas State Board of Health.

Dr. T. J. Cunningham, Jr., Pine Bluff, has joined his father in the practice of medicine.

Dr. C. Ray Williams, Booneville, has been elected Vice-President of the Booneville Rotary Club.

DEATHS

Dr. William Allen Campbell, Lexa, aged 66, died April 17 of carcinoma of the stomach.

Dr. Claudius Ezra Rector, England, aged 52, died April 5 of heart disease.

Dr. A. B. Wood, Quitman, aged 69, died April 6 of dilatation of the heart and myocarditis.

Dr. Elmer Thomas McGaugh, Potter, aged 66, died May 5 of acute dilatation of the heart.

Dr. Thomas Lee McDonald, Hope, aged 52, died June 26 as the result of an automobile accident.

DISTRICT OF COLUMBIA

The Mutual Health Service of the Medical Society of the District of Columbia has elected the following officers: President, Dr. Archibald L. Riddick, Washington; Vice-President, Dr. Thomas E. Mattingly, Washington; Secretary, Mr. Theodore Wiprud, Washington.

Dr. Francis Randall Hagner, Washington, was recently honored by the Alumni Association upon the occasion of his retirement after completing forty-five years' service on the faculty of George Washington University School of Medicine.

Dr. Leslie H. French, Washington, was recently named Vice-President of the Alumni Association of the George Washington University School of Medicine.

Dr. William Warren Sager, Washington, has been appointed Chairman of the Committee on Automobile Accidents recently established by the Medical Society of the District of Columbia to study the accident situation from the medical standpoint.

Dr. Charles Clark Kissinger, Washington, and Miss Mary Stribling, Seneca, South Carolina, were married June 22.

Dr. Leo Ignatius Donovan, Washington, and Miss Dorothy Marie Millard, Brooklyn, were married May 27.

DEATHS

Dr. Lazzlo Detre, Washington, aged 64, died May 26 of tumor of the brain.

Dr. John Allen Hornsby, Washington, aged 77, died June 4.

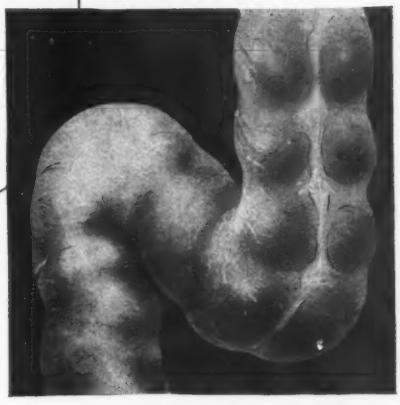
Dr. Charles Louis Billard, Washington, aged 60, died May 1 of cerebral hemorrhage, hypertensive heart disease and arteriosclerosis.

FLORIDA

Dr. H. Marshall Taylor, Jacksonville, a Past President of the Southern Medical Association, and Dr. Brien T. King, Seattle,

Continued on page 36

PREVENT TRAPPING IN THE COLONIC "CATCH BASIN" WITH MUCILOSE



WHEREVER POSSIBLE, the treatment of constipation should strive toward the production of a good drainage (normal) stool, thus avoiding the need for violent cathartic flushing.

MUCILOSE

helps to bring about a more normal type of peristalsis by providing bland, non-irritating, non-digestible, *lubricating bulk* in the colon.

We invite you to try Mucilose in constipation, colitis, and as a bulk-giving agent to supplement restricted dietaries.

Mucilose is a hemicellulose (vegetable gum) prepared by a special process from the Plantago loeflingii. You can prescribe it in either of the two palatable forms — MUCILOSE GRANULES or MUCILOSE FLAKES.

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Continued from page 34

Washington, are to share the Casselberry prize of the American Laryngological Association amounting to $500. Dr. Taylor for his work on the hygiene of swimming and Dr. King for his operation to relieve abductor paralysis by use of the omohyoid muscle.

Dr. Leigh F. Robinson, Fort Lauderdale, President of the Florida Medical Association, was recently presented a Hamilton watch by the Broward County Medical Society as a token of the Society's appreciation of his work and to honor him upon his elevation to the presidency.

Dr. Grady H. W. Brantley, Lake Worth, has recently been made Mayor of that city.

Dr. Leo C. Gonzalez, Jacksonville, is taking a postgraduate course in venereal disease control and public health at Johns Hopkins University School of Hygiene and Public Health. He has been relieved of his duties in connection with the Division of Venereal Disease Control of the State Board of Health by Dr. Leland J. Hanchett, of the United States Public Health Service.

Dr. W. H. McCullagh, Jacksonville, has been certified by the American Board of Neurology and Psychiatry.

At a recent meeting of the Florida State Board of Medical Examiners the following officers were named: President, Dr. Samuel G. Hollingsworth, Bradenton; Vice-President, Dr. Benjamin A. Chapman, Jacksonville; Secretary, Dr. William M. Rowlett, Tampa, reelected.

Dr. J. Maxey Dell, Jr., Gainesville, spent the month of June in Washington, D. C., doing special work at the Warwick Memorial Cancer Clinic and the Children's Hospital.

Dr. Joseph Halton, Sarasota, spent the month of July doing postgraduate work at the Mayo Clinic in Rochester, Minnesota.

Dr. George R. Creekmore, Brooksville, was recently appointed as a member of the Board of County Commissioners by Governor Fred P. Cone.

Dr. James A. Bradley, St. Petersburg, has been certified by the American Board of Internal Medicine.

Dr. Rufus Judson Pearson, Jr., Miami, and Miss Emily Timmerman, Atlanta, Georgia, were married May 20.

Dr. Robert Spencer Howell, Miami, and Miss Mary Louise Mullino, Montezuma, Georgia, were married June 7.

Dr. G. C. Ferrante and Miss Rose Marie Ferlita, both of Tampa, were married June 4.

DEATHS

Dr. Hirsch Sadowsky, Miami Beach, aged 55, died April 2 of hypostatic pneumonia and cerebral hemorrhage.

Dr. John Ballard Tower, Homestead, aged 65, died April 13.

Dr. William Conyngton, St. Petersburg, aged 81, died April 21 of carcinoma of the bladder.

Dr. Philip Henry Holmes, Tarpon Springs, aged 69, died May 5.

Dr. Charles B. Brewster, Eustis, aged 62, died April 24.

Dr. Louis S. Oppenheimer, Tampa, aged 85, died June 12 from a heart attack.

GEORGIA

The Calhoun County Commissioners, in a recent meeting, decided to dispense with the County Health Department to curtail expenses, effective July 1.

Dr. Isbin S. Giddens, Ray City, has been appointed Health Commissioner of Jenkins County with headquarters in Millen.

Dr. Oliver W. Jenkins, Edison, was recently appointed Health Commissioner of Bartow County, succeeding Dr. Robert F. Young, Cartersville, who resigned to enter general practice.

The Emory University Medical Alumni Association has elected the following officers: President, Dr. Howard Hailey, Atlanta; First Vice-President, Dr. Edgar Boling, Atlanta; Second Vice-President, Dr. Kells Boland, Atlanta; Secretary-Treasurer, Dr. M. C. Pruitt, reelected.

Dr. Braswell E. Collins, Waycross, has been elected to fellowship in the American Academy of Otolaryngology.

Dr. O. D. Hall, Atlanta, has resumed his practice at the Georgia Baptist Hospital, having completely recovered from his recent illness.

Dr. Leila D. Denmark, Atlanta, a pediatrician, and Dr. Mary J. Erickson, Thomasville, a pathologist, are among the Georgia women listed in "Who's Who."

DEATHS

Dr. Samuel A. Boland, Loganville, aged 66, died May 24 of cardiorenal vascular disease.

Continued on page 38

THE NEW YORK POLYCLINIC
MEDICAL SCHOOL AND HOSPITAL

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UROLOGY

A combined full time course in Urology, covering an academic year (8 months), will be inaugurated on October 1st, 1939. It will comprise instruction in pharmacology; physiology; embryology; biochemistry; bacteriology and pathology; practical work in surgical anatomy and urological operative procedures on the cadaver; regional and general anesthesia (cadaver); office gynecology; proctological diagnosis; the use of the ophthalmoscope; physical diagnosis; roentgenological interpretation; electrocardiographic interpretation; dermatology and syphilology; neurology; physical therapy; continuous instruction in cysto-endoscopic diagnosis and operative instrumental manipulation; operative surgical clinics; demonstrations in the operative instrumental management of bladder tumors and other vesical lesions as well as endoscopic prostatic resection.

Obstetrics and Gynecology

A full time course. In Obstetrics: Lectures; prenatal clinics; witnessing normal and operative deliveries; operative obstetrics (manikin). In Gynecology: Lectures; touch clinics; witnessing operations; examination of patients pre-operatively; follow-up in wards post-operatively. Obstetrical and Gynecological pathology; regional anesthesia (cadaver). Attendance at conferences in Obstetrics and Gynecology. Operative Gynecology on the Cadaver.

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MEDICAL EXECUTIVE OFFICER, 345 West 50th Street, NEW YORK CITY

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Continued from page 36

Dr. Eugene C. Brown, Hawkinsville, aged 60, died May 10.

Dr. Clarence Dunbar Hart, Savannah, aged 43, died April 9.

Dr. Irby Hammond Adams, Macon, aged 58, died April 5 of pulmonary tuberculosis.

Dr. Henry Lafayette Long, Leesburg, aged 71, died April 16 of uremia.

ANNOUNCING THE PUBLICATION
of the Fourth Edition of
"Nomenclature and Criteria for Diagnosis of Diseases of the Heart"
On Sept. 15, 1939. Price $2.00, Postage Prepaid
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Manufacturers and Distributors—Oxygen Tents, Nasal Catheter Units, Bedside Inhaling Outfits, Anesthetic Gas Machines, Resuscitators and Inhalators, Soda Lime.

Dr. Robert E. Gramlin, Atlanta, aged 61, died April 14 of coronary occlusion.

Dr. Roy Samuel George, Atlanta, aged 49, died May 5 of acute dilatation of the heart and cirrhosis of the liver.

Dr. Jesse Wallace Powell, Millen, aged 48, died May 18 of cerebral hemorrhage.

Dr. William W. Carmichael, Hampton, aged 74, died June 7.

Dr. Robert E. Wilson, Cartersville, aged 72, died June 2.

Dr. Lamar Preston Fordham, Pavo, aged 59, died June 9.

Dr. Harvey Hoyt Kemp, Senoia, aged 83, died June 17.

KENTUCKY

Dr. John B. Floyd, Richmond, has been elected President of the Kentucky State Elks' Association.

Dr. C. C. Threlkel, Morgantown, has resigned as Health Officer of Butler County because of ill health.

Dr. Frank Kash Sewell, Madisonville, has recently been appointed Health Officer of Breathitt County.

Dr. Andrew B. Colley, Tompkinsville, has recently been appointed Health Officer of Webster County.

The Fifth District Medical Society of the Kentucky State Medical Association has elected the following officers for the coming year: President, Dr. F. M. Travis, Frankfort; First Vice-President, Dr. O. P. Chapman, Port Royal; Second Vice-President, Dr. A. D. Doak, Shelbyville; Secretary, Dr. Owen Carroll, New Castle.

Dr. Meyer M. Harrison, Louisville, announces the opening of his office for the practice of medicine in the Heyburn Building.

Dr. John H. Rompf, Lexington, has been appointed Clinical Director of the Eastern State Hospital to succeed Dr. Charles C. Phillips, who resigned because of ill health.

Dr. Fred W. Rankin, Lexington, received the honorary degree of Doctor of Laws from the University of Maryland at the June commencement.

Dr. Richard Douglas Sanders, Louisville, was recently elected President-Elect of the Southern Association of Anesthetists.

Dr. Leon Hoskins, Harlan, and Miss Lida Lee Atkins, Pineville, were married in June.

Deaths

Dr. Cicero Maxwell Heavrin, Hawesville, aged 78, died May 27 of angina pectoris.

Dr. Lee J. Ernstberger, Louisville, aged 62, died April 16 of heart disease.

Dr. James Anderson Grider, Louisville, aged 67, died April 14 of lymphosarcoma with metastasis of the liver, spleen and heart.

Dr. Henry Chilton Osborn, Ashland, aged 56, died May 6 of a cerebral hemorrhage.

Dr. Webb Suter, Campbellsburg, aged 59, died May 23.

Dr. Horace Luten, Fulton, aged 65, died May 11 of coronary occlusion.

Dr. Joseph R. Burchell, Manchester, aged 88, died May 24 of lobar pneumonia.

LOUISIANA

Dr. Dorman B. Barber, Alexandria, has been made President of the Louisiana State Medical Society to succeed Dr. Clarence A. Lorio, Baton Rouge, resigned.

Dr. Rudolph Matas, New Orleans, was presented a certificate of honorary membership in the American Association of the History of Medicine at the annual dinner of the History of Medicine Society of Tulane University recently for work in having "preserved and passed on to generations of students the best traditions of medical humanism."

Dr. Wilbur C. Smith, Professor and Head of the Department of Gross Anatomy, Tulane University of Louisiana School of Medicine, New Orleans, recently received the honorary degree of Doctor of Science from Wake Forest College, Wake Forest, North Carolina, at the commencement exercises.

Dr. Emmitt L. Irwin, New Orleans, has been named Head of the Health and Safety Committee of the New Orleans Area Council, Boy Scouts of America.

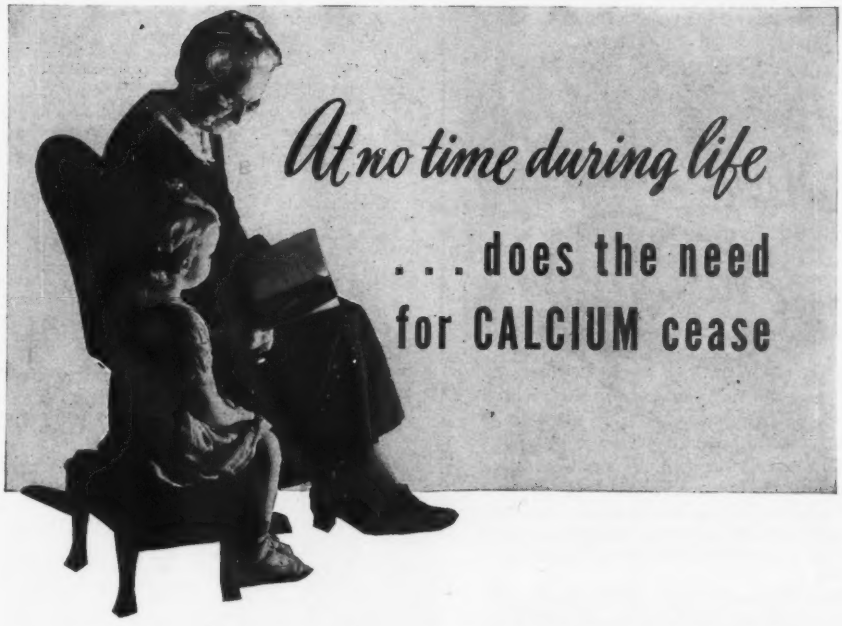
Dr. Lailor A. Morrogh, Jr., Arnaudville, has been appointed Director of the Avoyelles Parish Health Unit.

Dr. Bert L. Stinson, Homer, has been appointed Head of the Health Service of Claiborne Parish.

Dr. Christopher L. Mangis, New Orleans, has been appointed Director of the Iberia Parish Health Unit.

The Department of Medicine of the School of Medicine of Louisiana State University has instituted a visiting medical service for teaching purposes, in cooperation with the Department of

Continued on page 40



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Dicalcium Phosphate Compound with Viosterol Squibb supplies calcium, phosphorus and Vitamin D in therapeutically effective quantities. One tablet (or two capsules) contains 9 grains dicalcium phosphate, 6 grains calcium gluconate and 660 U. S. P. XI units of Vitamin D. The tablets are flavored with wintergreen and have a very pleasant taste. The capsules are useful during pregnancy or as an alternative dosage form. Capsules are available in bottles of 100 and 1000; tablets in boxes of 51 and 250.

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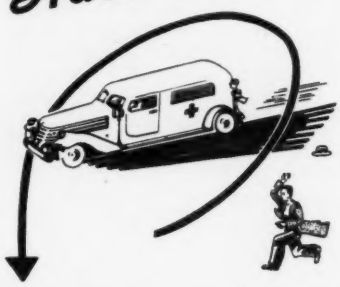

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A convincing demonstration of the Inductotherm will be arranged, or pertinent literature will be sent upon receipt of your request.

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Continued from page 38

Public Welfare of Orleans Parish. Medical services are supplied to clients on relief in the Department of Public Welfare by students in the School of Medicine, who are accompanied on every visit by an instructor and who work under his supervision. Dr. Edgar Hull is directing this service, assisted by Dr. Chester Fresh and Dr. Richard T. Stephenson, who have the title of field instructors.

Dr. Harry Aaron Davis, formerly connected with the University of Tennessee School of Medicine, has been appointed Instructor in Surgery at Louisiana State University School of Medicine.

DEATHS

Dr. Lucius Walter Holloman, Marksville, aged 49, died May 19 of coronary occlusion.

Dr. Lloyd Aloysius Masterson, New Orleans, aged 39, was killed in an automobile accident May 25.

MARYLAND

Dr. William Halsey Barker, Baltimore, Instructor in Medicine, Johns Hopkins University School of Medicine, has been appointed Assistant Dean of the Medical School.

Dr. Arthur Karfgin, Baltimore, has been appointed Chief Surgeon of the Maryland Casualty Company.

Dr. Thomas B. Turner, formerly of the International Health Division of the Rockefeller Foundation, has been appointed Professor of Bacteriology at the Johns Hopkins University School of Hygiene and Public Health.

Dr. Francis Alva Ellis and Miss Margaret Cecilia Bautz, both of Baltimore, were married July 1.

DEATHS

Dr. Henry Wheeler McComas, Oakland, aged 74, died April 10 of carcinoma of the prostate with metastasis.

Dr. James Lecompte Hooper, Baltimore, aged 69, died April 25 of perforated gastric ulcer and arteriosclerosis.

Dr. Harry Bell Galatian, Catonsville, aged 59, died April 17 of appendical abscess and perifonitis.

Dr. Leonard Murray Campbell Parker, Baltimore, aged 60, died April 22 of arteriosclerotic heart disease.

MISSISSIPPI

Dr. Harvey F. Garrison, Jackson, has been appointed Chairman of a Liaison Committee between the American Academy of Pediatrics and the American Medical Association. The other members of the Committee are Dr. Hugh L. Dwyer, Kansas City, and Dr. Albert D. Kaiser, Rochester, New York.

Dr. Daniel J. Williams, Gulfport, was recently presented with a silver cup at the annual meeting of the Mississippi State Medical Association for "outstanding service rendered organized medicine since 1891." Dr. Williams has been Health Officer of Harrison County for twenty-five years and was formerly President of the State Association.

Dr. G. C. Carlson, formerly of Merigold, has moved to Moorhead.

Dr. R. H. Bostwick, Indianola, has entered public health work and is now taking his training at the Coahoma County Health Department, Clarksdale.

Dr. Raymond F. Mayer, formerly of Pomaria, South Carolina, has entered public health work and is now taking his training at the Sunflower County Health Department.

Dr. Rome Turner Dabbs, Verona, and Miss Menta Taylor, Philadelphia, Pennsylvania, were married June 4.

DEATHS

Dr. Frank Hagaman, Canton, aged 43, was killed August 19 in an automobile accident.

Dr. James Edward Hulett, Hattiesburg, aged 56, died April 18 of acute intestinal obstruction.

Dr. James W. Crawford, Coldwater, aged 86, died April 13 of hypertension and intestinal hemorrhage.

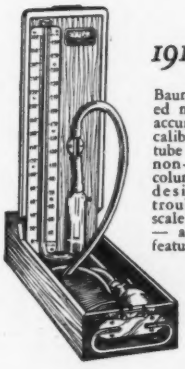
Dr. Ernest Jackson Hudspeth, Ruleville, aged 56, died April 21 of uremia.

Dr. Albert K. Barrier, Rolling Fork, aged 80, died May 31 of Parkinson's disease.

MISSOURI

Dr. W. W. Graves, St. Louis, will receive the St. Louis Medical Society's Gold Medal and Certificate of Award this year for his studies on inherited variations in relation to problems of human constitution.

Continued on page 42



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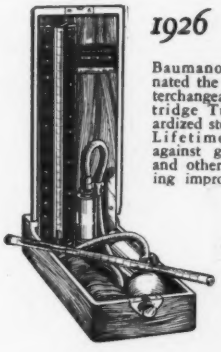
Baumanometer pioneered method of scientific accuracy by individual calibration — wide bore tube — non-oscillating, non-spilling mercury column — simplicity of design, eliminating troublesome valves, scale adjustments, etc., — all revolutionary features.



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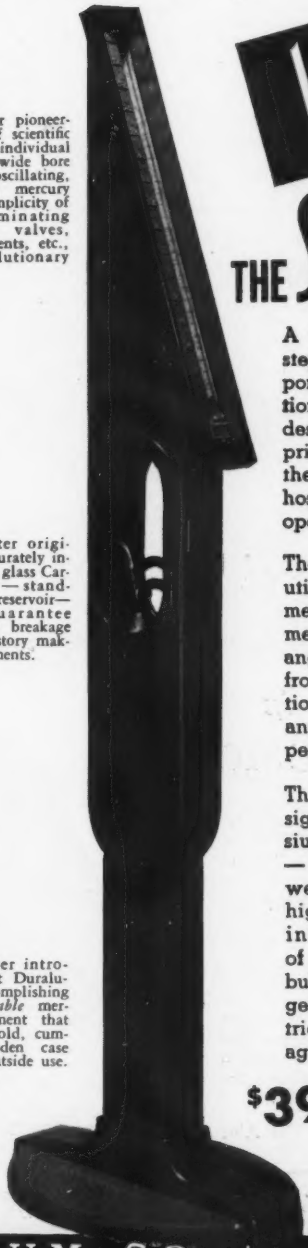

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Continued from page 40

Dr. Evarts A. Graham, St. Louis, will return the first of September from London, England, where he has served as Head of the teaching surgical unit of St. Bartholomew's Hospital this summer. He is the first American surgeon to fill this temporary position.

The St. Louis Medical Society was recently presented a bronze plaque by an anonymous donor in honor of the late Dr. Nathaniel Allison, at one time Dean of Washington University School of Medicine. The presentation was made by Dr. Elsworth S. Smith.

Dr. Frederick J. Taussig, St. Louis, and Dr. Paul F. Cole, Springfield, have been appointed members of the State Cancer Commission.

Dr. Doyle C. McCraw, Bolivar, has recently been appointed a member of the Board of Managers of eleemosynary institutions.

Dr. John Aull, Kansas City, has been appointed a member of the State Board of Health.

Dr. Frank R. Bradley, St. Louis, has been appointed Superintendent of Barnes Hospital.

Dr. Frank D. Dickson, Kansas City, was installed as President of the American Orthopedic Association at the recent meeting in Buffalo, New York.

Deaths

Dr. Samuel H. Miller, Joplin, aged 77, died April 8 of heart disease.

Dr. Frank John Iuen, Kansas City, aged 76, died April 14 of chronic nephritis and prostatic hypertrophy.

Dr. Stanley Mountjoy Hall, Moberly, aged 53, died April 18 of coronary thrombosis.

Dr. Henry S. Brookes, St. Louis, aged 80, died May 16 of coronary thrombosis.

Dr. Simeon Xavier Cordonnier, Carthage, aged 66, died May 16 of heart disease.

Dr. William Claude O'Neal, Palmyra, aged 64, died May 20 of myocarditis.

Dr. Robert Ellsworth Van Wickle, St. Louis, aged 31, died May 14 of heart disease.

Dr. Roche W. Hogeboom, Springfield, aged 63, died May 1.

Dr. H. Will Elders, St. Joseph, aged 65, died April 23 of arteriosclerosis.

Dr. Herman L. Nietert, St. Louis, aged 73, died May 9 of pneumonia.

Dr. Willard E. Grant, Hardin, aged 79, died May 4 of cerebral hemorrhage.

NORTH CAROLINA

The North Carolina Public Health Association has elected the following officers for the coming year: President, Dr. Avon H. Elliot, Wilmington; President-Elect, Dr. John W. Williams, Asheville; Vice-President, Dr. William P. Richardson, Chapel Hill; Secretary, Dr. John W. Roy Norton, Chapel Hill.

Dr. Vance P. Peery, Kinston, was recently elected President of the North Carolina Hospital Association at the annual meeting in Winston-Salem.

Dr. Isaac Hall Manning, Professor of Physiology, University of North Carolina School of Medicine, Chapel Hill, has retired from active duty and will be professor emeritus.

Dr. Carl V. Reynolds, Raleigh, has been reappointed State Health Officer for another four-year term.

Dr. Charles W. Armstrong, Salisbury, was recently honored at a testimonial dinner marking his twentieth anniversary as Health Officer of Rowan County.

Dr. Ballard Norwood, Jr., Oxford, has been appointed Health Officer of Granville County to succeed Dr. Joseph A. Morris, who has retired after service in this capacity for twenty years.

Dr. Wesley G. Byerly, Statesville, has been appointed Health Officer of the Burke-Caldwell District Health Department.

From July 31 to August 11 the Institute for Hospital Administrators was held at Duke Hospital. In addition to seminars and discussions a series of visits were made to other hospitals in Durham and five other towns in North Carolina.

Dr. Milton Block, formerly connected with the CCC Camp at Jerrico, has entered private practice at Lexington.

Dr. Frederick Austin, Jr., has opened offices in the Independence Building, Charlotte, for the practice of medicine.

Dr. DeWitt Cornell Daughtry and Miss Lucile Carr, both of Clinton, were married June 3.

Dr. Raymond Taylor Jenkins, Fort Bragg, and Miss Blanche Brickle, of Black Mountain, were married June 10.

Continued on page 44

Improved Results in

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The new, improved de Bakey Blood Transfusion Instrument, as used and endorsed by Michael E. de Bakey, M.D., Instructor in Surgery, Tulane University, New Orleans, transfuses whole, unmodified blood. As now made, the de Bakey unit uses a perfected milking tube principle. It avoids former difficulties in devices using this principle, yet maintains a simplicity in blood transfusion never before attained.

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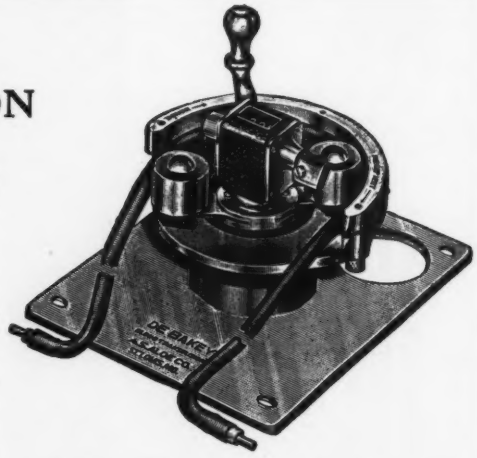

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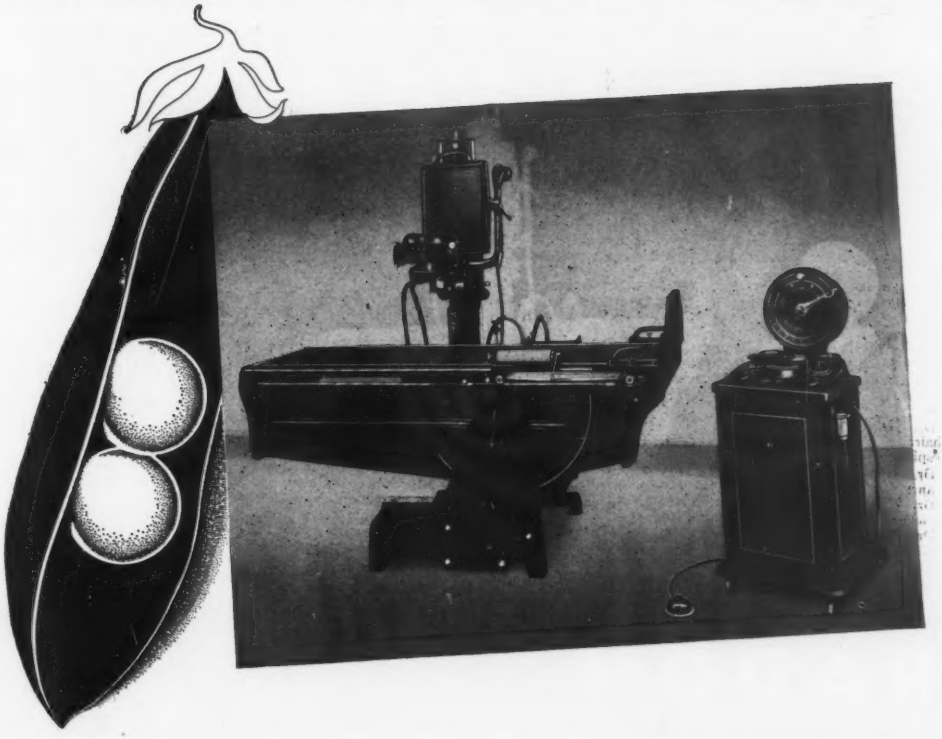

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Continued from page 42

Dr. Ralph Judson Sykes and Miss Edith Claire Leake, both of Mount Airy, were married in June.

Dr. Abram Jack Tannenbaum and Miss Leah Louise Baach, both of Greensboro, were married June 10.

DEATHS

Dr. Robert Drane Jewett, Wilmington, aged 79, died May 6 of lobar pneumonia.

Dr. Oliver J. Paris, Graham, aged 72, died May 2 of strangulated hernia.

Dr. Samuel H. Cannady, Oxford, aged 72, died June 22.

Dr. John Berry, Southern Pines, aged 54, died May 25 of coronary thrombosis, arteriosclerosis and hemorrhagic nephritis.

Dr. H. N. Abernathy, Charlotte, aged 74, died June 10.

OKLAHOMA

Dr. Ralph Bowen, formerly of Oklahoma City, announces his removal to Houston, Texas, 3509 Montrose Boulevard, practice limited to asthma, hay fever and other allergic diseases.

Dr. J. F. Park, McAlester, is attending clinics at London, England, and Edinburgh, Scotland, during his absence of six weeks.

Dr. Hugh H. Munroe, Lindsay, has recently been appointed County Health Superintendent of Garvin County.

Dr. N. Robert Drummond, Oklahoma City, has recently become associated with Dr. George H. Kimball for the practice of medicine.

Dr. James S. Perry, Guthrie, has recently been elected the Chairman of the Medical Staff of the Cimarron Valley Wesley Hospital.

Dr. J. B. Lampton, Sapulpa, did postgraduate work at the Pennsylvania Hospital during the month of June.

Dr. W. C. Tisdal, Clinton, has entered private practice and will be associated with Dr. Paul Lingenfelter.

Dr. T. W. Pratt has recently completed his internship and established his practice in Cheyenne.

Dr. Lewis J. Moorman, Oklahoma City, has been selected President-Elect of the American Trudeau Society.

DEATHS

Dr. George W. Buckmaster, Beaver, aged 81, died April 18 of cerebral hemorrhage.

Dr. Joseph B. Carmichael, Duncan, aged 74, died April 22 of carcinoma of the prostate.

Dr. James E. Hollingsworth, Strang, aged 68, died April 3 of atrophic cirrhosis of the liver.

Dr. William M. Campbell, Tulsa, aged 77, died April 21.

SOUTH CAROLINA

The South Carolina Medical Association elected the following officers at the recent annual meeting in Spartanburg: President, Dr. Douglas Jennings, Bennettsville; President-Elect, Dr. W. L. Pressly, Due West; Vice-President, Dr. C. H. Black, Greenwood; Secretary-Treasurer, Dr. E. A. Hines, Seneca, reelected.

Dr. Everett E. Herlong, Rock Hill, was recently elected President of the South Carolina Urological Association.

Dr. Thomas William Messervy, Jr., Meggett, and Miss Elizabeth Walker Gilberson, Charleston, were married June 2.

Dr. Carl Alden Sweatman, Columbia, and Miss Ruby Lee Turner, Winnsboro, were married June 8.

Dr. William Osce Self and Miss Nancy Anderson, both of Ninety-Six, were married in June.

Dr. Harold Pagan Hope and Miss Helen Jeter Hamilton, both of Union, were married June 22.

Dr. James Myers Hicks, Florence, and Miss Welker Delle Sellers, Mullins, were married June 15.

Dr. Henry F. Hall, Jr., Columbia, and Miss Mary Hennies, Chester, were married July 4.

DEATHS

Dr. Charles Porter Osteen, Sumter, aged 72, died April 14.

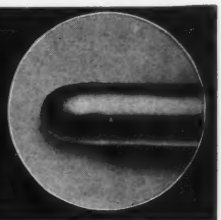
Dr. Samuel Furman Brasington, Camden, aged 65, died April 27 of hemiplegia.

Dr. William Davis Hope, Lockhart, aged 73, died April 27.

Dr. S. Percival Wells, Holly Hill, aged 64, died April 10 of coronary stenosis and nephritis.

Continued on page 46

RADON SEEDS



FOR safety and reliability use composite Radon seeds in your cases requiring interstitial radiation. The Composite Radon Seed is the only type of metal Radon Seed having smooth, round, non-cutting ends. In this type of seed, illustrated here highly magnified, Radon is under gas-tight, leak-proof seal. Composite Platinum (or Gold) Radon Seeds and loading-slot instruments for their implantation are available to you exclusively through us. Inquire and order by mail, or preferably by telegraph, reversing charges.

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NEWLY SYNTHESIZED...

CORTATE

(Desoxycorticosterone acetate)

SYNTHETIC HORMONE *of the* ADRENAL CORTEX

CORTATE* **(desoxycorticosterone acetate in sesame oil) is synthesized in pure crystalline form. Its chemical constitution is definitely known and the material will not deteriorate. Desoxycorticosterone, prepared synthetically, is identical with the naturally occurring substance isolated from the adrenal cortex.**

In CORTATE the physician should find a valuable addition to his armamentarium of synthesized hormone preparations. Desoxycorticosterone acetate has been administered in Addison's disease and its efficacy established beyond question. Since therapy with cortical extracts has been reported to give good results in the asthenias frequently accompanying convalescence from infectious diseases such as pneumonia, diphtheria, typhoid fever, and influenza, as well as in the more chronic constitutional types of cortical deficiency, the use of *Cortate* (desoxycorticosterone acetate) in these conditions would seem justified. Recent investigations indicate that certain allergies may be traceable to cortico-adrenal hormone deficiency and should be benefitted by administration of this substance.

PACKAGES

CORTATE is supplied in the following packages: 5 mg. crystalline desoxycorticosterone acetate in each cc. of sesame oil—boxes of 3 and 6 ampules of 1 cc. size; rubber-capped vials of 10 cc. size.

FOR ADDITIONAL INFORMATION, ADDRESS
THE MEDICAL RESEARCH DIVISION

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SCHERING CORPORATION

BLOOMFIELD, NEW JERSEY

Continued from page 44

Dr. Ernest Cooper, State Park, aged 62, died May 6 of cardiovascular disease and bronchopneumonia.

Dr. James Rufus Brown, Spartanburg, aged 71, died May 25 of cerebral arteriosclerosis.

TENNESSEE

Dr. Horton Casparis, Nashville, has been appointed a member of the Council of the Southern Medical Association from Tennessee to fill the unexpired term of Dr. Oliver W. Hill, deceased, the appointment having been announced recently by the President, Dr. Walter E. Vest, Huntington, West Virginia.

Dr. Ernest W. Goodpasture, Nashville, Professor of Pathology, Vanderbilt University School of Medicine, received the honorary degree of Master of Science from Yale University, New Haven, Connecticut, at the annual commencement exercises.

Classified Advertisements

RATES for insertion in the Classified Column are as follows: $2.00 minimum, which includes the first 50 words; for each word in addition to the original 50 words, the charge is 3c.

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from author's data. Ten years' experience with leading physicians and appointments on medical journals of highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 2220 20th Street, N.W., Washington, D. C.

SCABIES TREATMENT
Clinically Established*
NON-IRRITATING
PLEASANT ODOR
RAPIDLY EFFECTIVE
If you would like to give it a test, send 20c to cover handling and we will mail enough for one adult treatment.
*Report on 1213 cases on request
Pyrethrum Ointment Upsher Smith
UPSHER SMITH CO.
MINNEAPOLIS, MINN.
FINE DIGITALIS PRODUCTS

Dr. Jesse P. Baird, Dyersburg, was recently elected President of the West Tennessee Medical and Surgical Association at its annual meeting in Huntingdon.

Dr. Garth Edmund Fort, Nashville, and Miss Chloe Frierson, Columbia, were married in June.

DEATHS

Dr. David Taylor Davis, Chattanooga, aged 83, died April 29 of prostatic hypertrophy and acute retention of the urine.

Dr. James Henry Townsend, Collinwood, aged 70, died April 20 of nephritis.

Dr. Alfred W. Gross, Chattanooga, aged 58, died May 22.

Dr. W. T. Sharp, Farmington, aged 72, died June 18.

Dr. Erle Walker Hillsman, Trezevant, aged 61, died May 8 of angina pectoris.

TEXAS

Dr. Ralph Bowen, formerly of Oklahoma City, announces the opening of offices in Houston, 3509 Montrose Boulevard, practice limited to asthma, hay fever and other allergic diseases.

Dr. Preston Hunt, Texarkana, President-Elect of the State Medical Association, was honored with a buffet garden party and reception recently at the home of Dr. C. M. Rosser.

The Baylor Alumni Association has elected the following officers for the coming year: President, Dr. Andrew Small, Dallas; Vice-President, Dr. Guy Hacker, Dallas; Secretary, Dr. Tom Smith, Dallas.

Dr. Claurice M. Phillips, Levelland, and Dr. E. W. Wilson, San Antonio, were recently appointed to the State Board of Medical Examiners. Dr. Thomas J. Crowe, Dallas, has been reappointed Secretary for a term of six years.

The recently organized Texas Allergy Association has elected the following officers: President, Dr. James Harvey Black, Dallas; Secretary, Dr. Boen Swinny, San Antonio.

Dr. George V. Brindley, Temple, was recently elected President of the Texas Railway and Traumatic Surgical Association.

Dr. Talbot A. Tumbleson, Beaumont, was recently elected President of the Texas Pediatric Society.

Dr. Charles W. Castner, Austin, was recently made President of the Texas Neurological Society.

Dr. Leslie M. Smith, El Paso, was recently elected President of the Texas Dermatological Society.

Dr. Curtice Rosser, Dallas, was recently elected President of the Texas Society of Gastro-Enterologists and Proctologists.

Dr. Minnie L. Maffett, Dallas, was recently elected President of the National Federation of Business and Professional Women at the meeting in Kansas City.

Dr. Robert N. Graham, Del Rio, has been appointed Health Officer of Val Verde County.

Dr. Joe W. May, Donna, has been made Health Officer of Hidalgo County.

Dr. R. O. Peters and Dr. James B. Stubbs, of Sweetwater, recently opened a new clinic building for one day cases and minor operations.

Dr. D. D. Warren, Waco, was recently elected President of the McLennan County Tuberculosis Association.

Dr. T. N. Goodson, San Antonio, has been reappointed Health Officer of Bexar County.

Continued on page 48

To Assure Quick Dependable Response

Discriminating Physicians are Prescribing

the easily soluble

DUBIN AMINOPHYLLIN

THEOPHYLLINE-ETHYLENEDIAMINE

American Made from American Materials

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VEGEX AND VEGEX-VITAFOOD DRIED BREWERS' YEAST

The August Southern Medical Journal the Vegex-Vitafood Dried Brewers' Yeast copy gave the biological assays (Albino rat) showing 50 International B_1 units and 40 Sherman-Bourquin units per gram of what is designated as B_2, and 5% in a vitamin B complex free diet—devoid of any of the B vitamins—gave normal growth over a period of eighteen weeks. These tests are for the whole, natural product without any additions of thiamin, riboflavin, nicotinic acid or other synthetic parts.

CLINICAL RESULTS—PELLAGRA

Goldberger and his associates were the first to publish the man test for dried brewers' yeast following the work of Goldberger, Waring and Tanner (Reprint No. 874 from the Public Health Reports) in which they state:

"The idea that pellagra is a communicable disease receives no support from this study.

"Pellagra may be completely prevented by diet."

As yet grain grown dried brewers' yeast is the most potent and complete known source of what Dr. Goldberger designated as the P-P (pellagra-preventive) factor.

From the clinical record, as reported from health officers and physicians throughout the pellagra sections, may be taken:

"We have had the most favorable results in this county from the use of your product. I am safe to say that at least seventy-five per cent of the patients that have taken this product, over the course of two or three months, have been cured and the other twenty-five per cent have been arrested, where it was taken any length of time.

"You will probably be interested to know that nearly fifty per cent of our insane cases, previous to the use of yeast, in our Health Work here, were suffering from pellagra. The number of insane cases from this cause is now practically nil."

Another health officer writes:

"I have treated over eight hundred cases (of pellagra) successfully by giving your yeast and a rigid diet."

REGULAR AND WIDE USE BY PHYSICIANS

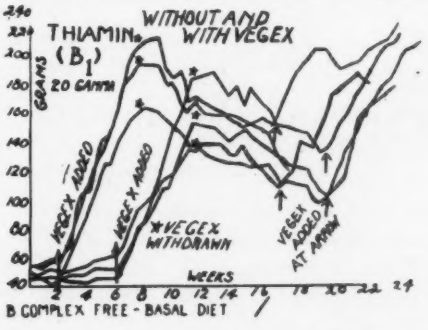
Out of almost five hundred replies to a questionnaire from physicians in the pellagra sections of the South, some 91% use Vegex-Vitafood Dried Brewers' Yeast in the treatment of pellagra and all report satisfactory results. The average amount for daily use is from one to three ounces. Along with the dried brewers' yeast fresh fruits, fresh vegetables, eggs, milk and butter are emphasized as well as all vitamins. The replies listed some sixty-six accompanying disorders.

VEGEX FOR THE PELLAGRA-PREVENTIVE FACTOR AND FULL VITAMIN B COMPLEX

Vegex, the condensed extract of autolyzed grain grown brewers' yeast, is among the pioneers for the full vitamin B complex in medical and nutritional research. It has now had the sixtieth published report showing aid in the treatment of the anemias; particularly for increasing the red blood cell count and hemoglobin percentage.

Mass man tests for pellagra have been had with Vegex with main use in Malay, Egypt, India, Roumania, Italy and the Southern States.

Thiamin (thiamin chloride) does not, alone, have the independent growth factor established for the B vitamins. In this test, after Vegex was withdrawn, the animals developed red inflammation around the ears, eyes and nose, loss of hair and dermatitis on jaws and paws, with dark, thick blood and increase up to 120% in hemoglobin. These conditions are showing relief with Vegex added back with the thiamin as shown in the chart.



Samples of Vegex and this Dried Brewers' Yeast in tablet or powder form, with special directions to physicians, will be sent on request.

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Aluminum Acetate Powder

(DOAK)

Astringent—Antiphlogistic—Antiseptic

A solution of ALUMINUM ACETATE (DOAK) contains no lead acetate or free acetic acid.

A 5% solution is therapeutically equivalent to Liq. Al. Acetatis or Burow's Solution.

A 1% solution of ALUMINUM ACETATE (DOAK) can conveniently be obtained by adding 1 teaspoonful of the powder to one pint of water.

Wet compresses of Solution ALUMINUM ACETATE (DOAK) are indicated in various types of Dermatitis, Moist Eczema and Hyperhidrosis. They are a valuable aid in the treatment of sprains, contusions and otitis externa.

Supplied in 4, 8 and 16 oz. bottles. Literature on request.

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For over forty years we have devoted our entire time to the manufacture of Ophthalmic and Nasal Ointments.

Combining highest quality ingredients with ethical distribution "M.E.S.Co." offers the profession the most comprehensive line of Ointments in the field.

Let us quote on your special formulae, or may we send you a catalog?

Manhattan Eye Salve Co., Inc.

LOUISVILLE, KENTUCKY

Continued from page 46

Dr. J. G. Welch, Beaumont, was recently elected Health Officer of Beaumont.

Dr. Z. T. Scott, Austin, was recently appointed Chairman of the Austin-Travis County Tuberculosis Hospital Advisory Board.

Dr. J. R. Barcus, Gladewater, has been appointed Health Officer of that City.

Dr. M. L. Hutcheson, Denton, has been appointed Health Officer of Denton County.

Dr. J. Shirley Sweeney, Dallas, recently received the honorary degree of LL.D. from Texas Christian University in recognition of his contributions to medical science.

Dr. Sam Driver, Dallas, has been elected President of the Texas Orthopedic Surgeons Association.

Dr. W. L. Alspach has moved from Orange to Pascagoula, Mississippi.

Dr. J. Byron Baird has moved from Bay City to Oklahoma City, Oklahoma.

Dr. W. W. Beach has moved from Petersburg to Lubbock.

Dr. Ernest H. Brock has moved from Houston to Pineville, Louisiana.

Dr. K. L. Buckner has moved from Pampa to Henrietta.

Dr. James O. Chambers has moved from Galveston to Fort Worth.

Dr. Richard C. Curtis has moved from Corsicana to Temple.

Dr. P. T. Donop has moved from Fredericksburg to San Antonio.

Dr. Homer B. Johnson has moved from Crane to Abilene.

Dr. H. J. Daplan has moved from Overton to Fort Bliss.

Dr. J. S. Kootsey has moved from Raymondville to Houston.

Dr. Thomas L. Lauderdale has moved from Ranger to El Paso.

Dr. T. H. McConnell has moved from Sulphur Springs to Houston.

Dr. Eugene V. Powell has moved from Temple to Fort Worth.

Dr. E. W. Prothro has moved from Kermit to Corpus Christi.

Dr. Gus Schreiber, Jr., has moved from Dallas to Sherman.

Dr. Howard W. Walker has moved from Fort Worth to Spartanburg, South Carolina.

Dr. George W. Wilhite has moved from Grand Canyon, Arizona, to Gonzales.

Dr. George V. Pazdral, Somerville, and Miss Lucile Brown, Fort Worth, were married June 15.

Dr. Lewis K. Tester, San Angelo, and Miss Ophelia Hurdt, Bowie, were married June 1.

Dr. Ruth Jackson, Dallas, and Mr. Dan McClung, were married July 1.

Deaths

Dr. Cullen P. Graves, Fort Worth, aged 77, died April 17 of coronary occlusion.

Dr. Vernon Ashton Hartman, Post, aged 54, died April 8.

Dr. Joseph M. Sanders, Scurry, aged 67, died recently of carcinoma of the throat.

Dr. Carl Kirby Arnold, Floydada, aged 48, died April 30.

Dr. Coalby T. Rives, Winter, aged 65, died May 14 of chronic nephritis.

Dr. William Robert Hazlewood, Austin, aged 68, died May 15 of carcinoma of the esophagus and mediastinum.

Dr. Terry Kinney, San Marcos, aged 71, died May 3 of heart disease.

Dr. Otto Clarke Dunsworth, Trenton, aged 68, died May 8 of pulmonary tuberculosis.

Dr. James F. Rosborough, Marshall, aged 83, died May 13 of coronary thrombosis.

Dr. Domitilo Rodarte, El Paso, aged 65, died May 31 of broncogenic carcinoma.

Dr. Ralph McDaniel, Waco, aged 68, died May 9 of combined sclerosis.

Dr. William Jeter Quinn, Dallas, aged 65, died May 23.

Dr. Robert Cloyd Smith, Wichita Falls, aged 76, died June 3 of cerebral hemorrhage.

VIRGINIA

The Medical Society of Virginia will hold its annual meeting in Richmond, October 3, 4 and 5.

The Dickenson-Buchanan County Medical Society have elected the following officers for the coming year: President, Dr. P. Q. Daniel, Big Rock; Vice-President, Dr. J. C. Trivett, Page; Secretary-Treasurer, Dr. T. C. Sutherland, Haysi, reelected.

The Manchester Medical Society has elected the following officers for the coming year: President, Dr. J. Blair Fitts, Rich-

Continued on page 50

Why JUST A, B AND D?

Physicians who prescribe for the gravida just two or three vitamins (and perhaps one or two minerals) usually do so from habit. Certainly the fetus drains multiple vitamins AND multiple minerals from the mother. Not depending on the average diet to supply the required double or triple normal daily quantities of these protective elements, a host of doctors make certain of adequate intake by recommending . . . .

VI-SYNERAL *

Contains Vitamins A, B_1, B_2 (G), D, E, fortified with eight essential minerals . . . the original Funk-Dubin multiple vitamin mineral concentrate.

"Mother and Child Doing Well"—Four tiny Vi-Syneral capsules taken once a day protects both mother and child against the risk of undernourishment.

All Age Groups

Need Adequate

Vitamins AND Minerals

ONLY VI-SYNERAL supplies a specially balanced vitamin-mineral potency for each age group . . .

1. **Expectant and Nursing Mothers**
2. **Adults**
3. **Adolescents**
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Other Vi-Syneral Advantages— Contains other factors of the Vitamin B complex in addition to Vitamin B_1 and B_2 (G) . . . Made from high-potency concentrates to avoid fishy taste or regurgitation . . . Convenient "carry-about" tubes.

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Please send me a sample of Vi-Syneral and a copy of the new Vitamin - Mineral Digest, suitable for distribution to patients.

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HORMOTONE "T"

makes available the therapeutic effect of standardized ovarian follicular hormones by oral administration, combined with thyroid.

Each tablet contains ovarian follicular hormones therapeutically equivalent to 200 units (international assay). It is Enterosol coated to prevent any destructive action of the digestive processes of the stomach.

Amenorrhea Menopause

Irregular Menstruation

Bottles of 40 tablets

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Newark, New Jersey

Continued from page 48

mond; Vice-President, Dr. Richard A. Bowen, Richmond; Secretary-Treasurer, Dr. A. S. Hurt, Jr., Richmond.

Dr. Samuel A. Vest, formerly of Baltimore, has been appointed professor and head of the Department of Urology at the University of Virginia Department of Medicine, Charlottesville.

Dr. M. M. Pinckney, Richmond, has been appointed Chairman of the first-aid committee of the Richmond Chapter of the American Red Cross.

Dr. James B. Pettis, Staunton, has been appointed an associate professor of neurology and psychiatry at the University of Virginia.

Dr. Francis N. Taylor, Petersburg, was recently elected a Director of the Lions Club of that City.

Dr. Paul W. Bowden, Arlington, has been appointed Health Officer of Southampton County to succeed the late Dr. Causey.

The Virginia Society of Ophthalmology and Otolaryngology elected the following officers at their recent meeting in Roanoke: President, Dr. Karl S. Blackwell, Richmond; Vice-President, Dr. George G. Hankins, Newport News; Secretary, Dr. Mortimer H. Williams, Roanoke, reelected.

Dr. William H. Fuller, Williamsburg, has recently been appointed Director of the Peninsula Health District, succeeding Dr. Jack B. Porterfield who has joined the staff of the State Health Department in Richmond.

Dr. Benjamin R. Allen, Chatham, has been appointed Health Officer of the Suffolk-Nansemond-Isle of Wight District, succeeding Dr. Thomas Scarlett, who has been assigned the Rockingham County Health District with headquarters at Harrisonburg.

Dr. Wyatt E. Roye, Richmond, has been appointed Health Officer of the Alleghany-Botetourt District with offices in Covington, to succeed Dr. James H. Gordon, who has resigned to take graduate work in Philadelphia.

The Medical College of Virginia, Richmond, has recently received a grant of $3,000 from the John and Mary R. Markle Foundation for research in biochemistry and a grant of $700 for research in preventive medicine from the Dazian Foundation. A grant of $5,000 has been given by the American Tobacco Company for research in the department of pharmacology.

Dr. Eugene M. Landis, formerly of Philadelphia, has been appointed Professor of Internal Medicine at the University of Virginia to succeed the late Dr. James C. Flippin.

Dr. John C. Neale, Jr., Staunton, has resigned as Health Officer of Augusta County and Dr. Vernon A. Turner, Richlands, will succeed him.

Dr. W. G. Crockett, Professor of Pharmacy at the Medical College of Virginia, Richmond, was awarded the honorary degree of Doctor of Science by Hampden-Sydney College at its recent commencement exercises.

A portrait of Dr. David Hunter Tucker, former Dean and Professor of the theory and practice of medicine, has been presented to the Medical College of Virginia, Richmond, by Dr. Beverley R. Tucker, a great nephew.

Deaths

Dr. Robert W. McConnell, Ft. Blackmore, aged 71, died April 5 of cerebral hemorrhage.

Dr. John Woolfolk Winston, Norfolk, aged 59, died April 17.

Dr. Robert River Robertson, Portsmouth, aged 77, died May 24.

Dr. James Massie Gleason, Amonate, aged 32, died May 25 of heart disease.

Dr. Reuben William Bennett, Gretna, aged 63, died July 13.

Dr. Adam George White, Lynchburg, aged 81, died June 3.

Dr. John Lewis Harvey, Simpsons, aged 53, died June 27.

Dr. Hiram Kilgore McConnell, Gate City, aged 58, died July 14.

Dr. Henry Holmes Hunter, Whaleyville, aged 54, died June 17.

Dr. Herbert Mann, Richmond, died July 7.

Dr. Jeffrey Neese Elder, Hopewell, aged 49, died May 11.

WEST VIRGINIA

A series of postgraduate conferences in obstetrics and pediatrics was held in West Virginia under the auspices of the division of maternal and child hygiene of the West Virginia State Health Department, from July 17 to August 18.

Deaths

Dr. Zophar Mills Bardin, Logan, aged 57, died April 24 of cerebral hemorrhage.

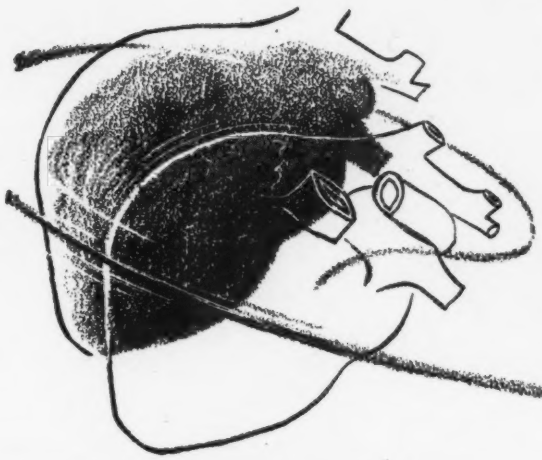
Dr. George E. Papadopoulos, Weirton, aged 52, died April 5 of osteitis of the fourth and fifth lumbar vertebrae and uremia.

Dr. Tib Newberry Goff, Kenova, aged 61, died April 30.

Dr. Walter C. Beard, Lewisburg, aged 80, died May 27 of hypostatic pneumonia.

Dr. William Lee Simpson, Wellsburg, aged 64, died July 15.

Dr. Lyle B. Hart, Beckley, aged 31, died July 6.



The Heart Takes A Double Beating

The edema associated with cardiovascular disease places a double burden on the already embarrassed heart. Its appearance in the most important portions of the body and impairment of respiration further weakens cardiac function.

T C S

Theobromine Salicylate	Free Fluid Flow
Calcium Salicylate	
Phenobarbital	Better Heart Action
a synergistic combination	

T C S effects comparatively rapid and copious increase in urine output by effective vasodilation, and thru stimulation of renal epithelium. By dilating coronary arteries, it improves blood flow to heart muscles, to promote more efficient myocardial nutrition and activity. Phenobarbital acts as a general sedative and helps reduce the blood pressure where hypertension is an involvement.

The calcium of T C S temporizes the solubility for minimal gastric irritation and speedier utilization. Thus, T C S may be given over an extended period with relative safety.

Take a Load Off The Heart when edema is present—with T C S Tablets. Also indicated to remove excess fluid in edema of chest and abdominal cavity; pain of angina pectoris; myocarditis; dropsy; hypertension; arteriosclerosis with edema. Bottles of 50 and 250 tablets.

Samples gladly furnished to requesting physicians

WILLIAM P. Poythress & CO., INC.
RICHMOND, VIRGINIA

PABLUM
HE LIKES PABLUM
PABLUM

MEAD'S BREWERS YEAST

Again Improved!

AT NO INCREASED COST TO THE PATIENT

- MEAD'S BREWERS YEAST TABLETS

Vitamin B_1 potency increased from 25 to 50 International units per gram. Vitamin G (riboflavin) potency increased from 42 to 50 Sherman units per gram. Each tablet now supplies approximately 20 units each of these vitamins, so that dosage may be calculated readily in round numbers by the physician. Supplied in bottles containing 250 and 1,000 6-grain tablets.

- MEAD'S BREWERS YEAST POWDER

is also thus increased in potency per gram. In addition, it is now improved in texture so that it mixes more readily with various vehicles the physician may specify in infant feeding. Supplied in bottles containing 6 ozs.

MEAD JOHNSON & COMPANY, Evansville, Indiana, U.S.A.

Ethically Marketed
without dosage directions
to the public

RESEARCH, CONSTANT RESEARCH

One of a series of advertisements prepared and published by PARKE, DAVIS & CO. in behalf of the medical profession. This "See Your Doctor" campaign is running in the *Saturday Evening Post* and other leading magazines.

"WHAT'S COME OVER SALLY?"

LIFE IN THE McCormick household has suddenly become full of unpleasant surprises.

Sally, the merry little girl with "such a sunny disposition," is now a creature of unpredictable moods. She is given to easy tears and sudden fits of temper—quick to take offense at some chance remark. It's obvious she's not herself.

What should Sally's parents do about it? Pronounce her behavior inexcusable and devise a punishment to fit the crime? Or suffer the outbursts in silence?

No, because they are sensible people, Sally's parents will do neither of these things. They will look upon her emotional upsets chiefly as evidence that something is *physically* wrong—that bodily readjustments are sending up danger signals that should be heeded promptly. And realizing this, they will take her to the family doctor.

There is every reason why a girl entering her teens should be given regular check ups by a physician. Important changes are taking place which frequently throw the body's delicately-adjusted glandular system out of balance.

This is often a cause of headaches, weight disturbances, and emotional outbursts. During adolescence, heart and lungs need watching. At this time, tuberculosis, anemia, and appendicitis become greater hazards.

The doctor can not only help remedy "the troubles of the teens," but if the child is brought to him early, he can often forestall them. He can correct any organic weakness.

Under the physician's sympathetic direction, adolescence is usually a happier prelude to healthy, happy womanhood.

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The World's Largest Makers of Pharmaceutical and Biological Products

SEE YOUR DOCTOR